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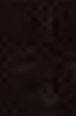
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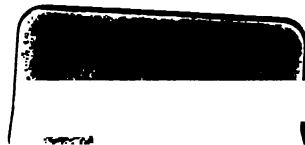
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HISTORY  
OF  
THE NINETEENTH CENTURY.





HISTORY  
OF  
THE NINETEENTH CENTURY.  
*For Schools.*

BY  
WILLIAM FRANCIS COLLIER, LL.D.,  
AUTHOR OF "GREAT EVENTS OF HISTORY," ETC.



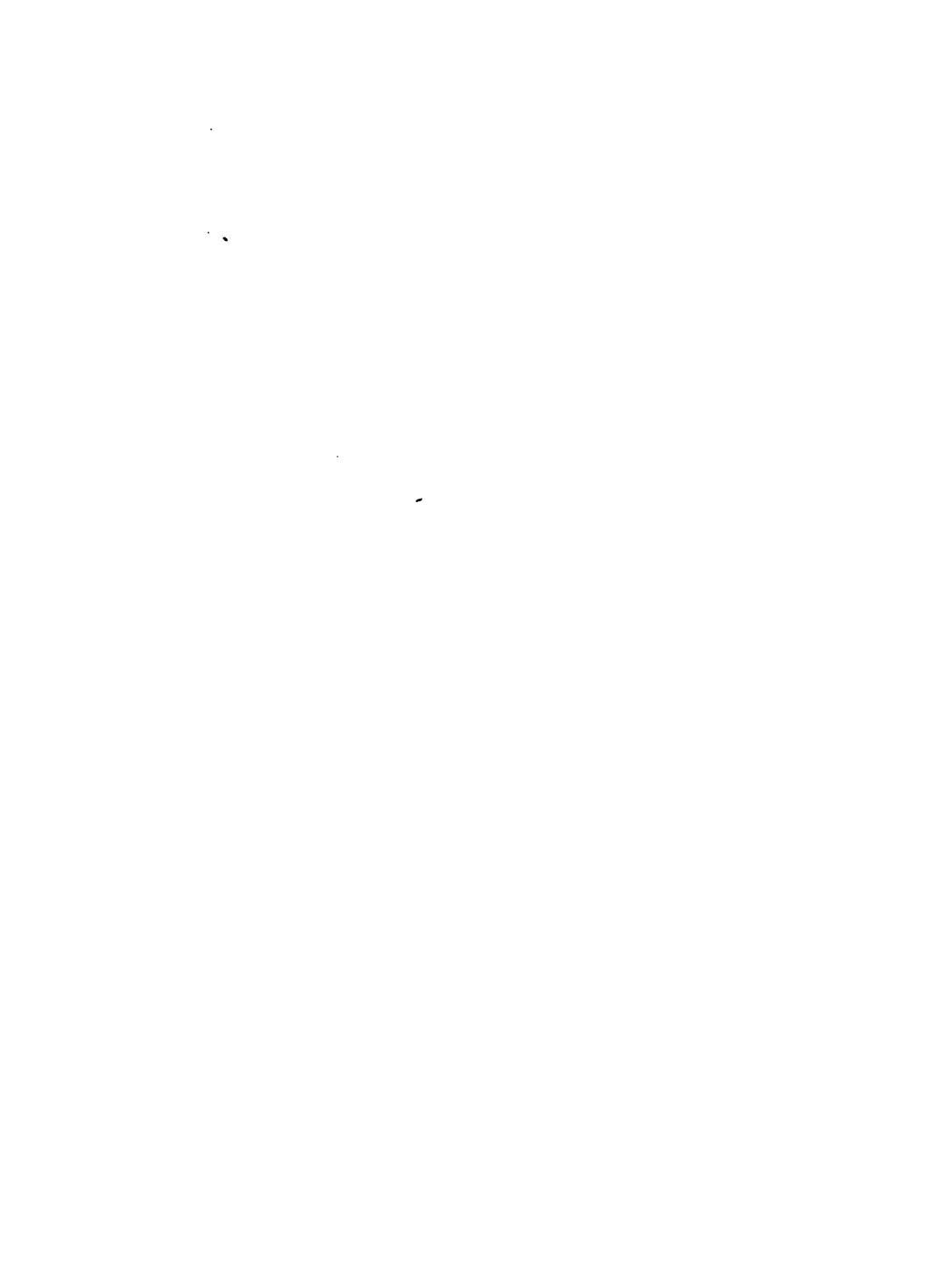
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## PREFACE.

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THERE are many reasons why the Nineteenth Century should possess for us a deeper interest than that attaching to any other period of History.

We belong to it ourselves—every newspaper teems with allusions to its recent events—there are still among us men who have witnessed its birth and can remember when George III. was King—we are every day living a life shaped by its great inventions, that multiply our power, wealth, and comfort to a degree undreamed of, eighty years ago.

But it has special and intrinsic claims, which oblige us to study its story in fuller detail than we usually accord to the earlier periods. For the Century of the Steam-car, the Iron-clad, and the Electric-wire is beyond doubt the grandest of all the Centuries as yet unrolled by Time.

The present Volume affords a view of the Progress achieved by the Century so far as it has yet advanced; and since those who are now young must make the History of its remaining decades, it is necessary that they should be well acquainted, in origin and detail, with the incidents and inventions out of which that History must directly flow.



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# HISTORY

OF

## THE NINETEENTH CENTURY.

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### INTRODUCTION.

THOMAS CARLYLE selected Frederic the Great, King of Prussia, as the hero of a biographical work, for the characteristic reason that "he managed not to be a *liar* and a *charlatan*, as the rest of his century (the Eighteenth) was." These are hard words; and all the harder, because true. Let us see how the Eighteenth Century came to deserve them.

When the year 1700 A.D. arrived, the long reign of Louis XIV. over France was drawing near its end. This pompous little man, the slave of flatterers, ruled over a Court in which the Artificial and the Cold were studied in life beyond all other things. Everything natural was repressed; the very trees at Versailles were not allowed to grow after the fashion of their own nature, but were clipped, and distorted into leafy images of ships, dragons, and such things. This frost of artificialism settled stiff and lifeless upon French literature too; and, by the force of reflected example, upon our own. Instead of the grand human characters of Shakspeare, we have, in the dramatic works of the time, the polished statues, which Racine has endowed with the gift of speech. Through life and literature, through the outward

wrappings of dress, manners, and amusements, this frost of falsehood penetrated to the very heart of the times. Truth and naturalness became unfashionable. Instead of patriotism, grew up that devotion to politics, as a means of selfish advancement, which enabled Sir Robert Walpole to buy his way to power, and hold the British Parliament in his purse for years. Instead of domestic purity and faith, the example of France—never wholesome in this respect—taught men to laugh at virtue, until the stage teemed with comedies in which the most unblushing licentiousness was paraded with applause. Instead of religion there came first a lifeless formality, then a sneering scepticism, and lastly a mocking infidelity, until it became the miserable fashion to pretend belief in neither God nor goodness. I say, *pretend*; for no man was ever yet, or ever will be, an infidel on his deathbed.

France, being then a focus or centre of influence, owing to her military renown and her supremacy in those arts that gild the life of civilized nations, spread these fatal influences with destructive effect far and wide, until the century came to deserve the character Carlyle has given it. In Britain there was a healthy root of Puritanism, which, though often cut down and seared, continued to preserve sufficient life partly to neutralize the poison. And, as in France chiefly the Upas-tree, that blighted the times, drew its poisons from the soil, and grew to a pernicious height; so in France arose the storm that laid it low, and swept the air clear of its destroying breath.

That storm, so fierce and destructive, yet so pregnant with results of benefit to man, was the FRENCH REVOLUTION, which overthrew feudalism for ever, and swept away the rotten landmarks, to make room for a new and better history.

Certain signs, which in looking back can be clearly seen, but which those then living scarcely noticed, betokened the coming of the tempest. The *roturier* scowled more blackly every year, as he left his hungry children, while he went out to toil for nothing on the public roads, in payment of the *corvée*, or gave the gatherer of the poll-tax the *sous* which should have bought a loaf of black bread for the little

ones. The farmer muttered dark things, as he paid the hated *gabelle* or salt-tax, which was forced from him, whether he would or not, at four stated times in the year. And, as the noble rolled down in his gilt coach to his chateau in the hunting-season, with a suite of mistresses and gamblers, to satisfy whose rapacity his timber was cut down and his vassals were starved, it is little wonder that the gaunt and desperate men in ragged blue blouses, who gazed on the gorgeous vehicle creaking by, should have learned to hate the order, to whose oppression and vice their misery was due. There was sad prophetic truth in Louis the Fifteenth's dying words—" *Après moi le deluge.*"

In 1789 the *Third Estate*, being excluded from the other Houses of the States-General, formed the National Assembly: and, when the Paris mob heard that soldiers were coming to dissolve this body, the "many-headed monster" rose. The Bastille was stormed. France became a Republic; and the ill-fated Louis XVI. perished by the guillotine. Then followed the Reign of Terror, a scene of blood and blasphemy, ending only when Robespierre, the murderer-in-chief, himself perished by the knife to which he had consigned so many.

It was a frightful discipline; but, as storms weeps poisoned air away, as destructive flood leaves on the submerged fields a fertilizing soil, so this crisis of horror left behind it purified fragments out of which a new France—a new Europe—a new World arose. It is this new state of things whose history I propose to trace in outline.

Since the cannon of Napoleon saved the Directory in 1795, more than seventy years have passed. These fall naturally into three periods.

I. Of the First Period the great Napoleon is the leading figure, and War is the chief subject. But there are peaceful revolutions, and on these I intend to dwell more particularly in the present work. *Steam* is the magician of this time—the revolutionizer and worker of miracles. The First Period extends over twenty years (1795–1815).


II. Though troubled with some revolutionary wars, the Second Period may be characterized as chiefly a time of peace. It lasted for nearly forty years (1815–1854), during



which were witnessed the destruction of many hoary evils, and the birth of many inventions,—chief among them the Electric Telegraph, which more than realizes Puck's idea of "putting a girdle round the Earth in forty minutes."

III. The renewal of war at the beginning of the Third Period gave rise to great improvements in the construction of iron ships and guns. The past fourteen years have accordingly been, in a sense, an Iron Age.

The history of the Nineteenth Century, therefore, so far as it has yet advanced, has been a history of extraordinary activity and progress in general knowledge and the industrial arts.



FIRST PERIOD.  
THE NAPOLEONIC WARS.  
(1795-1815.)

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CHAPTER I.  
HISTORY OF WAR.

NAPOLÉON BUONAPARTE emerged from the storms of the French Revolution, as the one man whose iron grasp was to seize the shattered fragments of the monarchy and knead them into a military despotism.

Becoming at the age of twenty-six the French Republic's General in Italy, he humbled Austria at Lodi, Arcola, and Rivoli (1796-7). Then, with eagle eye fixed on India, he poured his legions into Egypt, in the hope of securing that key of the East. It was here that history began to show from what source defeat and disaster were at last to descend upon him. English Nelson destroyed his fleet at the Nile; and Sidney Smith beat him back from the ramparts of Acre. But he was one whom at this period defeat served only to stimulate. Taking advantage of the troubled politics of Paris, which in affairs of State may be regarded as identical with France, he made himself First Consul—at first for ten years (1799), and afterwards (1802) for life. This dignity brightened, two years later, into an Imperial Crown, which he assumed for the first time in 1804. Previous to the attainment of this honour, he had again measured his strength with Austria, defeating this great power with signal success at Marengo and Hohenlinden (1800-1).

Thus, at the opening of the Nineteenth Century, we discern the figure of this great soldier, small in bodily presence

but with a chainless ambition swelling his breast, standing by the French throne, which he is so soon to ascend, and poising his sword to smite and subdue the surrounding nations. For fifteen years *his* story is the story of Europe.

The nation, whom he despised as "shopkeepers," but who showed the possession of a military genius equal to his own, and a power of endurance that far surpassed the brilliant effervescence of French valour, now came more prominently forward to defend the liberties of Europe. With the instinct of genius he recognized, in this island-foe, the mightiest of his adversaries, and his darling scheme, pondered over for years, was the invasion of Britain. Once he thought he saw a chance of success (1803). He gathered 150,000 troops on the north-west coast of France, fixing his central camp at Boulogne; but on the opposite shore there mustered an army of 300,000 Volunteers, and Horatio Nelson, the greatest of British sailors, watched the Channel with so keen a gaze, that the flotilla, collected to convey the intending conquerors over to "perfidious Albion," dared never leave the shelter of the French coast. So the vision dissolved.

A strong coalition was now formed to curb the ambition of the Corsican. Of this, Britain, Austria, and Russia were the most powerful adherents. Fighting, as yet, chiefly by sea, Britain struck a deadly blow at Trafalgar (1805),—a victory saddened by the death of Nelson. But at Austerlitz in Moravia, on the 2nd December 1805, Napoleon inflicted on the allied forces of Austria and Russia a defeat so terrible as to paralyze for a time their energies. This was the crowning splendour of Napoleon's sword, in the full lustre of which we see him acting the part of "king-maker," and learning to regard the European Continent as a gigantic chess-board, whose potentates were to be moved, or permitted to remain at his pleasure. Before any cloud began to rise upon his fame, he flung Prussia bleeding at his feet on the field of Jena, and taught the Russian Czar a second sharp lesson at Friedland.

The Peninsular War (1808-13) formed the first great series of disasters which the eagles of Napoleon underwent. From Vimiero to Vitoria his marshals (for he himself was only three months of 1808 in the Peninsula) suffered a succession

of defeats, which drove them from Spanish soil, and expelled Joseph Buonaparte, the Emperor's brother, from the throne he had usurped. The hero of this war was Arthur Wellesley, created Duke of Wellington in recognition of his splendid services; which, however, were but an earnest of a greater work yet to be done.

During the progress of this war, Napoleon was personally engaged in the heart of the Continent. At Wagram (1809) he defeated Austria; and he soon received from the humbled Hapsburgs a princess of their line, to wife. Irritated by the *brutum fulmen* of a Papal Bull, the conqueror seized the Pope in his own palace and carried him off to France. In 1811 he had achieved the summit of his greatness. He really ruled Continental Europe, for his brothers and dependents held various thrones, and he had humbled Austria, Prussia, and Russia. As Protector he swayed the destinies of two Confederacies—those of the Rhine and Helvetia.

The end was not far off. In 1812, penetrating Russia to Moscow, with an army of half a million, he abandoned a city in flames to face a march through snow and storm, more powerful and pitiless than any foes he had yet encountered. The bullets and lances of the Cossacks, who swooped upon his rear, were often a merciful relief to his troops from the agonies of frost and hunger.

Another army soon sprang at his bidding. At Leipsic he stood at bay, the centre of a contracting curve of troops, converging upon France. For three days he fought with desperation (1813); but it was in vain. Abdication remained his only resource; and he was reduced from the splendour of the Tuileries to the obscurity of the Villa Martini at Elba. But his troops, lounging in French villages, remembered their "little Corporal." In ten months he escaped, landed near Cannes, and in a few days was sitting in the Tuileries, sketching the outlines of a new campaign.

This campaign lasted just four days. Invading Belgium on the 15th June 1815, he was utterly routed on the 18th in the great battle of Waterloo by the British under Wellington and the Prussians under Blücher. This closed his military career, and gave Europe rest from the wars excited by his boundless ambition.

**Summary of Political Changes.**—The political changes produced in the affairs of Europe by Napoleon may be thus summed up :—(1.) He formed the French Republic into an Empire in 1804. (2.) He made the Batavian Republic into the Kingdom of Holland in 1806, placing his brother Louis on the throne. (3.) He aided in making his General Bernadotte Crown Prince of Sweden in 1810. (4.) He dissolved the ancient German Empire, erecting most of the States into the Confederation of the Rhine under his own protection, and forming from others the Kingdom of Westphalia for his brother Jerome. He also confirmed the elevation of Austria to the rank of Empire. (5.) He made the Grand-Duchy of Warsaw out of a part of Poland, wrested from Prussia. (6.) He formed Switzerland into a Confederation under French protection, annexing three of its cantons to France. (7.) He forced his brother Joseph as King upon unwilling Spain in 1808. (8.) He forced the House of Braganza to abandon Portugal for Brazil. (9.) He overthrew Venice, formed Northern Italy into the Cisalpine Republic, changed that into the Italian Republic, and this into the Kingdom of Italy. (10.) Tuscany became in turn the Kingdom of Etruria, a part of France, and a Grand-Duchy. (11.) The throne of Naples was filled by Joseph and then by Murat. Such were his chief alterations in the map of modern Europe. To reduce these changes to the position of affairs before the French Revolution, was the task which met the great Congress of Nations assembled at Vienna in 1815.

**Mode of Warfare.**—The principal arms of the infantry during the Napoleonic wars were the musket and the bayonet. The former, which came in Britain to be familiarly styled “Brown Bess,” was a gun of great weight, with a flint-lock. The flint easily lost the sharpness of its edge: the powder in the pan, which was kindled by a spark struck downwards, was easily damped, and then would not explode: and, even when the gun did go off, the leaden bullet, round and about an ounce in weight, flew wildly over the field, missing much oftener than hitting the object aimed at. We shall see, as the century advances, important changes in the *materiel* of war. Then at sea, the “wooden walls” of Old

England floated, huge and many-tiered, often during battle lashed to a foe, exchanging broadsides of round iron-shot that splintered and ripped the oaken sides of the contending vessels, till one of them struck its flag or sank. In the meantime, from the cradles on the masts, musketeers shot at the officers on the hostile deck. The cannon were heavy pieces of iron and brass, fired by means of a fuse inserted in the touch-hole. But in no respect has the mode of warfare changed more than in the conveyance of armies and the mode of communication. Later in the century we shall see the Locomotive and the Electric Telegraph actually at work on the field of war. In Napoleon's time an army was followed by a vast procession of mule-waggons, baggage-carts, &c.; forming a retinue that clogged and hampered the movements of the whole force. Anticipating, by forced marches, the celerity with which a vast number of troops can now, on the wings of Steam, be concentrated on a given point, the great Corsican soldier, by the sudden dash of his movements, gained a reputation for ubiquity, which made his foes tremble. In fact it was in this partly that the secret of his success lay. How deficient were the modes of communication, as compared with those of the present day, may be judged from the fact that the battle of Toulouse was fought on the 10th April, 1814, while on the 4th—nearly a week earlier—Napoleon had signed the Act of Abdication, which closed the war.

## CHAPTER II.

## STEAM APPLIED TO MACHINERY.

**Motive Power.**—There is almost always a striking little story attached to the birth of a great invention or discovery. It is said that a Marquis of Worcester, while imprisoned in the Tower during the reign of Charles I., saw with surprise, as he sat moodily by the fire-place, the lid of a boiling kettle blown off by the expansive force of the pent-up vapour. Acting on this hint, he constructed a “fire water-work,” by which water was raised from the Thames. Savary and Newcomen added improvements to the great invention, of which the Marquis’s kettle was the germ. And in 1769—the year of Napoleon’s birth and Wellington’s—was born from the brain of a native of Greenock, then earning a precarious living in Glasgow by the manufacture of optical and musical instruments, the Steam-engine, which multiplied our manufacturing power a thousand-fold, enabling us to bear unharmed the strain of the Napoleonic struggle, and the weight of a debt which would have crushed a weaker State.

But it was reserved for the Nineteenth Century to witness the successful application of steam-power to travelling on sea and land, by inventions which bring New York within a ten-days’ trip from Europe, and reduce the journey from London to Edinburgh—once a week’s undertaking—to the space of a single night.

Let us take first in order the invention of the Steam-boat, as it came into practical shape some time before the Locomotive.

**The Steam-boat.**—In 1786 a young engineer named Symington exhibited at Edinburgh a small boat, which could be moved in any direction by wheels impelled by steam; and, two years later, a successful trial-trip of

another vessel, built by the same man, took place on Dalswinton Loch in Dumfries-shire. Catching sight of Symington's invention, a restless American artist named Fulton jotted down certain notes; from which he built at New York a paddle steam-boat, the *Clermont*, which plied on the Hudson, to the great alarm of simple sailors and country folk, who could not understand the nature of the clumsy thing, that despised wind and tide, puffing out its contempt in smoke and red sparks of pine-wood. This boat made its trial-trip in 1806.

The man, that actually placed the Steam-boat on British waters, was Henry Bell, a carpenter, who established himself as the keeper of a small hotel at Helensburgh on the Clyde, a village opposite to Greenock, the birth-place of Watt. Attracted by the success of Symington and Fulton, he set to work so energetically, in spite of sneers and laughter, that in 1811 the *Comet*, a steam-boat of twenty-five tons burden, with an engine of four- 1811 horse power, was floating on the Clyde. Like all A.D. inventors, Bell was met with distrust and the malice of those who derived profits from coaches and sailing-boats. But the *Comet* triumphed over all opposition. Its boilers did *not* burst. Its passengers were *not* landed in mutilated fragments. The weight of its engine did *not* break the vessel's back. Before long, other steam-boats were churning the seas and friths round Britain; and the success of the invention was placed beyond dispute.

The establishment of deep-sea and ocean steam-ships belongs to the next period of the century.

**The Locomotive.**—Read a story of last century, in which the hero is made to travel, and you find a Waggon, crawling with the toil of many horses along roads which are often quagmires, stopping every night at some road-side inn, and in danger at every sudden turn or dark wood of the highwayman with mask and pistol. Turn to a tale of the present time, and you find the forger fleeing from justice or the parent hastening to his dying child by the Express Train, which shrieks and rattles along the iron road at the rate of fifty miles an hour. To whom is this change—one of the most momentous of our century—mainly due, but to George



Stephenson, originally a herd-boy, and afterwards the fireman to the engine of a coal-mine.

Born at Wylam, in the shire of Northumberland, George grew up in the poor cabin of his father, who was an engine-man. In early life he loved to fashion hemlock-stalks and mud into the rude model of an engine. Later, nothing pleased him so well as to take to pieces and polish the engine of which he had charge. His success in repairing an engine at Killingworth raised him in position, and turned his genius more ardently towards invention. The great difficulty, which he had to surmount in the construction of the Locomotive, was the formation of a wheel which, when driven by steam, would grasp the rail instead of slipping round. Under the patronage and encouragement of Lord Ravensworth he tried experiments and worked patiently on, until in 1814 he constructed a Locomotive-engine, worked by steam, and capable of carrying thirty-two tons of coal at the rate of four miles an hour. In

**1815** the following year an improved engine, with nearly  
 A.D. all the improvements necessary for a practical purpose, was finished and at work.

The battle was not yet over; and, though it passed into the next period of the century, it is best to tell its issue here. It remained a point of hot dispute whether a car driven by steam could safely be used for passenger traffic. This question was set for ever at rest by the Stephensons, father and son. A railway having been constructed between Liverpool and Manchester, through the skill and industry of Stephenson, over a treacherous morass called Chat Moss, which from quaking sponge became firm roadway, the directors offered a premium of £500 for an engine that should weigh only six tons, and run ten miles an hour.

The prize was won, when the Stephensons placed  
**1830** on the rails the *Rocket*, an engine which nearly

A.D. trebled the required rate of speed. From that day the Locomotive and the Railway became supreme in the land, as a mode of travelling. One by one the iron roads were laid down for the "iron horse" to glide like the wind to its destination, carrying a living freight to be counted by the hundred thousand. One by one the old

stage-coaches dropped off; and only in the remoter parts of the mountain districts is such a vehicle ever to be seen now.

From 1825 the Railway system continued to grow, until now in Great Britain there are about 9000 miles of rail in constant traffic. Travellers are multiplied in consequence to the enormous yearly average of a hundred millions; and, not content with covering the surface of the land with an iron net-work, the enterprise of the age has tunnelled an under-ground railway through the foundations of London, so that a person can seat himself in a lighted carriage, and be whirled miles away without fear of his vehicle being blocked among the cabs and carts that crowd the thoroughfares of the metropolis.

The trains, or "cars," as Americans call them, travel ordinarily at the rate of twenty-five miles an hour; but express speed often reaches sixty miles.

"The Locomotive, however, if it works hard, eats voraciously. At ordinary speed it consumes about twenty pounds of coke per mile; so that, costing £2500 to begin with, and spending an allowance of £2000 a year, it would be rather an extravagant labourer, only that it works hard for the money, and earns it over and over again. With all its strength and size it is a much more delicate concern than would be supposed; the 5416 different pieces, of which it is composed, must be put together as carefully as the parts of a watch; and, though guaranteed to go two years without a doctor, it exacts the most devoted attention from its guardians to keep it in order."

Its travelling facilities have, therefore, become a striking characteristic of our century. Men, whose fathers were content to visit London once in their lives, and who perhaps derived their ideas of the ocean from the Thames at Greenwich, are now familiar with the Alps and the Danube, think nothing of a run across the Atlantic, and have been known to take a return-ticket for Australia. Accidents of collision, running off the line, &c., occur occasionally—but wonderfully seldom, when we consider the enormous traffic; for the organization of the Railway System provides for the most rigorous care, accuracy, and punctuality among the host of officials to which it gives employment.

## CHAPTER III.

## PROGRESS OF LITERATURE.

**Break-up of Artificial Style.**—The artificial mannerism, which fell like a frost on English Literature after the Restoration, continued to grow stiff and hard during the first half of the Eighteenth Century; but during the latter half of that period signs of thaw appeared, of which an early instance was the favourable reception of the “Vicar of Wakefield.” But it was reserved for the close of the century to witness the decided breaking-up of the brilliant though lifeless style, which, for a time regarded as the perfection of English writing, had reached its acme in the poetry of Pope.

It is usual to ascribe a great réaction in favour of the Natural to the publication in 1765 of the “Reliques of English Poetry,” by Thomas Percy, Bishop of Dromore; and assuredly the rough and picturesque simplicity of the old ballads in this collection struck with admiration many readers, upon whom the polish and glitter of the French Style had come to pall. But the réaction was chiefly due to the original poetry of men like Burns, from whose heart, as from a fresh fountain, song bubbled untinged with a shade of artifice—like Cowper, whose calm domestic muse was nurtured by the water-lilies of the peaceful Ouse—like Crabbe, stern photographer of the pathos underlying the most sordid lives—and like Scott, whose manly martial chant disdained all petty feebleness of dandified verse, and swung on with the free step of a Border chieftain on the raid.

**Johnsonese.**—In prose the Artificial, changing to the Pompous, found its expression in the elephantine style of Johnson, and the gorgeous historical cartoons of Gibbon. And, after poetry had become natural, the example of these

great writers and others of a similar style maintained this element of inflation and bombast in our English prose. Scott, who was himself not quite free from the influence of Johnsonese, aptly compared the imitators of the Doctor's style to "dwarfs trying to stagger along under the armour of a giant."

Throughout the present century the tendency of style, as influenced by our greatest writers, such as Thackeray, Tennyson, and Macaulay, has been distinctly towards shorter sentences, and a diction brightened with picturesque words of Anglo-Saxon birth.

**Criticism.**—The expansion of Criticism into a distinct department of Literature, though growing slowly during the two previous centuries, may be regarded as one of the characteristic features in the literary history of the Nineteenth Century. The establishment of the *Edinburgh Review* in 1802 by a band of ardent young Whigs, among whom Jeffrey and Brougham were conspicuous—the birth of a brilliant antagonist, the *Quarterly Review*, in 1809, to represent the Tory or Conservative principles—the rise of *Blackwood* into public favour, chiefly by the daring eloquence, sarcasm, and unscrupulous intrepidity of Wilson and Lockhart,—all combined to inaugurate a new era in Critical Literature, dating from the early years of the present century. Periodical literature has multiplied in the form of newspapers, daily and weekly—magazines, issued every month—and the heavier artillery of the quarterly publications,—until all the golden pens of the land are so absorbed in supplying the constant demands of readers now numbering millions, that some of our foremost men are scarcely known as the author of a book, except it be in the form of a republication of their scattered articles.

**Satire.**—A certain form of the modern periodical devotes itself to Satire; in which field the artist and the author work together. Of such the principal paper is *Punch*, which has now existed for a quarter of a century with unimpaired vigour. To it Jerrold lent his wit—Thackeray his genial cynicism—Leech a pencil that portrayed with golden humour the fun and follies of the passing day.

**Printing by Steam.**—The application of steam to the

Printing-press was one of the principal agents by which Literature was expanded to its present enormous proportions. A Saxon mechanician named Koenig, adopting the plan of surrounding an upright cylinder with type, and passing a sheet between it and another revolving drum, constructed a steam-engine capable of being applied to printing. In 1814 Mr. Walter, the proprietor of the *Times*, began to use the machine; and such improvements have been made on it since, that to print off 15,000 or 20,000 impressions in an hour is regarded as nothing uncommon in our great newspaper offices. This invention has aided much in the diffusion of cheap literature; an advantage which has been further facilitated by the use of *esparto*, a Spanish grass or rush, in the manufacture of paper, in place of the more expensive linen-rag.

**Different Schools.**—The School of Literature most in vogue at the beginning of the present century was the Romantic, of which Scott and Byron may be regarded as the chief exemplars. A reaction in favour of the more simple and commonplace modes of life produced the Lake School of Poetry, and prepared the way for the reign of Realistic Fiction, such as that written by Thackeray and Trollope. An influence, which has sunk deep into both poetry and some forms of prose, was derived from Germany, where a tendency to mystic and profound thought prevails. Thomas Carlyle is the most Germanized of English writers.

**History.**—Lord Macaulay, in his splendid fragment of the "History of England," inaugurated a new mode of writing history, by which that important branch of study is endowed with the freshness and interest of a novel. Discarding the old ideas of the "dignity of history," which resulted generally in pomposity and frequently in dullness, this great literary artist painted the life of the people, and made the prominent figures in the story stand out with striking effect by the happy introduction of personal details—in fact, by skilfully interweaving the biographical element with the historical, after the model of the Greatest of all Histories.

**Literary Features of the Age.**—Among the most notable features of Literature during the middle of the Nine-

teenth Century—i.e., during the past generation—are the following:—

1. The abundance of *Novels*, of which the best have been such pictures of existing life as the works of Charles Dickens and William Makepeace Thackeray, undoubtedly the princes of recent fiction, supply. A striking fact is the number of lady-writers now enrolled in the ranks of our successful novelists. Among them we find such names as Charlotte Brontë (known as Currer Bell), and Miss Evans (known as George Eliot). A rage for the Sensational—for violent effects of crime and mystery, to be unravelled only in the last chapter of the third volume—for beautiful heroines capable of the blackest wickedness, and other startling contrasts of the kind—has disfigured Fiction recently; but such fashions are short-lived. The Drama has been so much affected by this disease, that in the land of Shakspeare and Jonson there is some danger of a play degenerating into little more than “dumb show” set in magnificent scenery and appointments, and abounding in startling situations.

2. The tendency towards Biography rather than History as a narrative of human action. How Macaulay interweaves biography with his historical details has been already mentioned; but for one History written now-a-days we have fifty Biographies. It would seem as if the writers of our age had become suddenly impressed with the truth of Dryden’s simile, “that Biography condenses in a burning focus the rays of light which shine in History, scattered and diffused.”

3. The great number of books of *Travel* published. This has arisen partly from the remarkable facilities for travel afforded by the railway and the steam-boat, but more especially from the vigour with which British enterprise has thrown itself into the great work of geographical exploration. Africa, to which future pages will be devoted, after remaining a gigantic problem from the early ages, has given up the secrets of her unexplored regions to brave men like Livingstone, Speke, and Baker; and the records of their toil and peril are eagerly read by scores of hundreds. Australia, Central Asia, the wilds of North and South America have also found their brave explorers. The rapidity with which

a readable and valuable work of travel may be compiled in the present day of swift locomotion, may be judged from a single instance. Mr. Hepworth Dixon, the present editor of the *Athenæum*, left London in the beginning of August, crossed the Atlantic, spent some weeks at Salt Lake City west of the Rocky Mountains, and returned to enjoy his Christmas in England, while about the New Year the reading public were enjoying two substantial volumes, a picturesque narrative of his observations during this journey of some 12,000 miles.

4. The multitude of *Serials*, chiefly of a lighter kind, but aiming, many of them, at the instruction and improvement of the Working Classes. The Magazine of modern days contains one or two works of fiction, running regularly through the work; some sketches of travel or adventure; a popular account, perhaps, of some new invention, or the present aspect of some scientific question; a couple of poetical pieces; and an essay or two, political, critical, social, or nondescript.

That the present age, the nucleus or centre of the Nineteenth Century, is *not* to us a poetical age, is a fact we cannot disguise. It has been styled an "Iron Age," for reasons which we shall understand further on; and with the rush and roar of the Locomotive in our ears, and the Telegram speeding daily to our doors, it is hard to realize the poetry underlying the hurry of the familiar *Now*; but, when Time shall have left the Nineteenth Century far behind, it will in all likelihood seem as picturesque and poetical to posterity as the days of the Crusades or the Armada seem to us.

## CHAPTER IV.

## ADVANCE OF SCIENCE AND INDUSTRY.

(1795-1815.)

IN relating the progress of the present Century it will be convenient to notice the occurrences of the few previous years ; for it is in the end of the Eighteenth Century that we find the germs of inventive thought, from which have sprung the greatest marvels of the Nineteenth.

Science made rapid strides. In **Astronomy** one of the foremost names was William Herschel, a native of Hanover, who, coming to England, supported himself for a time by his musical talents. Then, attracted towards the study of the heavens, he constructed a telescope upon Newton's plan ; and with this he diligently examined the stars, taking them in clusters, until his perseverance was rewarded in 1781 by the discovery of a new planet, which he at first regarded as a comet. In the laborious work of exploring the heavens from sundown to dawn, noting the appearances of the stars, and calculating their motions, he received the assistance of his sister Caroline. At Slough near Windsor he constructed a great reflecting telescope on an improved plan ; and with this, which was completed in 1789, he made important discoveries, beginning with Saturn and his satellites.

The knowledge of **Electricity**, an agent which has been made to work such marvels in the present age, developed rapidly in the closing decades of the last century. Galvani, a native of Bologna in Italy, having devoted himself to the study of electricity, made experiments on the nerves and muscles of frogs, from which he deduced a system of results, many of which proved erroneous. He gave his name to that branch of electrical study called Galvanism. Volta of



Como was his great opponent and co-discoverer. The chief subject, to which this philosopher devoted his mind, was the existence of electricity in metals; and in the course of his experiments he invented the Voltaic Pile, consisting of a number of zinc and silver cups placed alternately on one another, and connected by wires, the electricity being excited by a saline liquid in the cups. This invention was completed in 1800.

Sir Humphry Davy, born in 1778 at Penzance in Cornwall, applied electricity to chemical analysis, and by its means made brilliant additions to scientific knowledge, especially the discovery that the fixed alkalies have a metallic basis. His **Safety-lamp**, first described in 1815, is of incalculable benefit in a land that so greatly depends on mining as Britain does. Like many great inventions, the Safety-lamp is distinguished for its simplicity of structure. It consists merely of a cylinder of wire-gauze, surrounding a light, and so carefully closed at top and bottom that no air can enter except through the meshes of the metallic network. The fire-damp or explosive gas can pass through when cold, but its flame, when ignited, cannot spread to the outer gas. Thus the lamp affords a warning as well as a protection, for the ignition of the gas within the gauze shows the miner the presence of his dreadful foe.

It was during this period that **Coal-gas** began to be used for lighting buildings and streets. A Cornish engineer, named Murdoch, after preliminary experiments, of which the earliest were in 1792, lighted the works of Boulton and Watt—the Soho Foundry—of Birmingham with this substance in 1801; and in a few years Pall Mall and Golden Lane in London glittered with the new light. In mills and streets it soon became common, wherever coal was abundant and tolerably cheap; but there was for a long time a prejudice against its use in houses, from a feeling that it loaded the air with unwholesome impurities.

The public health was much improved by the introduction of **Vaccination** by Dr. Jenner. His triumph was not complete until 1799. At an early period of his professional life he heard at Sudbury that milkmaids and others, whose hands had been infected by an eruption on the udder of the

cow, were secure against the small-pox, which was then a terrible scourge of all classes, but especially the lower orders, in England. This idea rested in his mind; and about 1780 he began to make experiments, which proved entirely successful. Though he met with neglect and ridicule—the usual fate of those who try to benefit their race with novelties of science—he persevered in pressing his discovery, until the London physicians, from whom his chief opposition had arisen, were forced to acknowledge the importance of the discovery, and adopt its use. Since then the loss of life by small-pox has been enormously lessened.

In Engineering—especially the making of **Roads, Bridges, and Canals**—the name of Thomas Telford, born in 1757 in Eskdale, Dumfries-shire, stands pre-eminent at the beginning of the century. Between the years 1801 and 1823 he formed the Caledonian Canal, by constructing artificial trenches to unite the chain of lochs running diagonally through Inverness-shire. He was employed during the same time by the Swedish Government to make the Gotha Canal, connecting Lake Wener with the sea. The great road from London to Holyhead was laid under his direction; and the Menai Suspension Bridge, formed of tight-drawn chains, formed one of his triumphs in connection with this work.

Another Scotsman, John Loudon Macadam, associated his name intimately with road-making at this time, by the adoption of a method still in common use. From his name we got the word *macadamize*, which means to spread layers of stones, broken into small angular pieces, upon the road; so that these, beaten hard and smooth by the traffic, may form a firm crust.

To the close of the Eighteenth Century can be traced the rise of the great **Iron manufacture**, now existing in Great Britain. In previous days Sweden and Russia supplied Britain with two-thirds of the bar-iron she needed, although the precious metal was locked up in great quantities under her own soil. A great difficulty in the way of cheap production was the necessity for using charcoal in the refining furnaces. Foremost among the men who sought to bring the native resources of Britain into play was Henry Cort,

an iron-master in the Dean Forest, who set his wits to work upon the problem. We had not wood in Britain sufficient to supply the furnaces that refined the iron : could it not be accomplished by some other means ? Years, thought, and money at last combined to secure the desired result, which was attained about 1785. Cort invented the process called *puddling*, by which cast iron was exposed on the hearth of a certain kind of furnace to the flame of pit-coal, and was thus converted into wrought iron. This was then, by a second invention, drawn by grooved rollers into bars, instead of being subjected to the tedious and expensive routine of the hammer and the anvil. By Cort's process a better iron was produced at one-twentieth of the original cost. It is unpleasant to add that the frauds of a partner, who embezzled Government money intrusted to him as Deputy Paymaster of the Navy, involved Cort in ruin, for his patent was confiscated, and his hopes of wealth utterly destroyed.

The great struggle with Napoleon excited much activity in the iron manufactures of Britain. The demand for cannon, cannon-balls, and bomb-shells was unceasing ; and Birmingham became a great centre for the making of musket-barrels. These, formed of strips of iron rolled into a cylinder, were, in the heat of the struggle, turned out at the rate of a *gun per minute*. Nothing but a minute and enormous division of labour could have produced this result.

The gradual improvement of machinery for spinning and weaving **Cotton**—the *Spinning-jenny* of Hargreaves, the *Water-frame* of Arkwright, the *Mule* of Crompton, and the *Power-loom* of Cartwright—took place chiefly before the opening of the Nineteenth Century. By these machines, and the later improvements on them, “one person could, in the year 1815, produce as much yarn in a given time as two hundred persons could have produced two hundred years before.” A new article of clothing was provided for the middle and lower classes. Calico, printed in colours in delicate patterns, and capable of being washed clean with all the colours fresh ; and muslins, formerly a costly and luxurious robe from India, came to be seen everywhere, having superseded the coarse linens and woollens of previous times.

The introduction of *chlorine*, whose bleaching powers were discovered by Scheele in Sweden in 1774, enabled manufacturers to whiten in a few hours webs that would have previously taken months to bleach.

A vast advance in the weaving of figured **Silks** resulted from the invention of the Jacquard loom. A poor weaver of Lyons, with a bent for mechanical contrivances, brooded over the idea of abridging the labour and time necessary to complete an elaborate pattern in brocade or damask, until he invented not a loom but rather an appendage to a loom. "It is intended to elevate or depress, by bars, the warp threads for the reception of the shuttle; the patterns being regulated by means of punched cards, acting on needles with loops and eyes." This machine was completed about 1801; but for many years the inventor was obliged to struggle hard against the enmity of the silk-weavers of Lyons, who saw in his machine only a device for depriving them of bread. At one time he narrowly escaped being flung into the Rhone; his machines were torn to pieces; the workmen spoiled their webs on purpose to bring the invention into evil odour; but the loom prevailed, and was introduced into every silk-weaving country, even into China, which was the cradle of this delicate manufacture.

The invention in 1808 of Congreve rockets, so called after the artillery officer who introduced them into warfare; and that of the percussion lock in 1803, by the Rev. Mr. Forsyth, are note-worthy points in the progress of missiles and fire-arms. In 1814 Dr. Brewster—afterwards Sir David—invented an optical toy called the Kaleidoscope, which has been of considerable service to designers of coloured patterns.

## CHAPTER V.

## DOMESTIC AND SOCIAL LIFE.

(1795-1815.)

SOME of the houses, in which our grandfathers dwelt at the beginning of the present Century, may still be seen in the decayed streets of our cities, or hiding within high-walled gardens on the edges of some tortuous suburban by-road, from which the tide of traffic has long turned aside into straighter and wider channels. For a brief time in early summer the laburnum and lilac may dress the old place in beauty; but, when leaf and blossom fade, the time-stained, moss-grown front, ending in a peak at the roof, becomes visible; and, within, are low-ceiled rooms with walls panelled, not papered, with narrow windows, often hermetically sealed, and never opening at the top. The furniture was in keeping with the house. There were the straight-backed chairs, on which prim ladies sat with painful uprightness, knitting and silent. There was the jingling harpsichord—scarcely better than the Elizabethan *virginals*, from which it was lineally descended. And, in the bed-room, a close fusty chamber hung with damask or velvet of the most dismal aspect, stood the four-posted bedstead, like a gigantic hearse, so high that steps were needed for the perilous ascent. Therein the sleeper rested (if he could), sunk in the centre of a mass of yielding feathers, the bed-curtains being carefully drawn round, and tied, so as to exclude the faintest chance of the admission of fresh air. The occupant of this unwholesome couch had probably drawn a thick woollen night-cap down to his nose; and there he lay, so accustomed to semi-suffocation in various forms that he regarded it as “comfort.” Should light be needed, a rush-light burned dim in a basin on the floor.

Such being the interior of the houses, let us look at the streets. Here the great needs of ventilation and sewerage were but imperfectly studied and provided for. The refuse was often allowed to accumulate, polluting the air; and a shower turned black dust into blacker mud. Narrow and crooked thoroughfares prevented the free sweep of wind and passage of light, so essential to the health of cities. Large open drains, in which festered the sewerage of many thousand houses, sent up death and disease in the foul steams that rose heavily from their stagnant waters. But in this respect there are cities in the Empire, brimming with wealth, that have still much need of reform.

The meals of fashionable folk seem to have grown gradually later during the past seventy or eighty years. It is, after all, but an apparent change—a mere change of names, not of time. Now, breakfast at ten, a substantial lunch at two, tea (the kettledrum) at five, and dinner at eight, are established institutions in the upper world; whereas in the middle of the last century the eating was performed exactly after a similar fashion, though for “lunch” they said “dinner,” and for dinner “supper.” The old Scottish tea (called “four-hours”) was but the modern kettledrum, a century earlier.

The great vice of the table was drinking, which at the beginning of the century was carried to a most pernicious excess. Every person in a company was expected to propose a toast, and a glass must be emptied to each sentiment proposed. The host looked upon it as his bounden duty to send his guests away intoxicated, and felt, if he failed to do so, that he had failed in hospitality.

Ruinous gambling was also constantly practised, especially among the higher classes; and the duel with pistols cost many a life, valuable to a family or to the country. Indeed at the bar and in other public arenas it was almost necessary for a man to fight his way up to eminence; and lawyers frequently adjourned from the court, officers from the mess-table, and even members from the House of Commons, to give or receive what was called “satisfaction” for some blow or insulting words.

Dress underwent a marked change about the opening of

the century. The wig and the knee-breeches went out of fashion; and the example of Wellington—greatest man of the age—induced the wearing of a plain frock coat with trousers descending to the foot. The uniform of the British soldier too changed with the age. He lost the hair-powder, the three-cornered hat, pomatum, and queue or pigtail of the previous century; and among other novelties after the battle of Waterloo, the Life Guards and the Horse Guards Blue began to wear the cuirass—which now lingers as the only specimen of armour at all resembling that used in the days of knighthood.

The ladies appeared at the turn of the century in long narrow skirts, and waists of ridiculous shortness. An ungainly bonnet of the coal-scuttle shape was then in vogue; and all trace of the old hoop—ancestress of the modern crinoline—was discarded. But the changes of ladies' dress are too many and too sudden to be noted in a sketch like this.

Fashion affects furniture as well as dress. Rosewood came to be now regarded as a more modish material than mahogany; just as walnut-wood has since to a large extent superseded rosewood in the manufacture of the more delicate articles of furniture.

In the kind and the tone of public amusements the Nineteenth Century is certainly better than its predecessor. And of this change symptoms were showing themselves before 1800. The theatre was decidedly purer, though there was still (indeed we may say *is still*) much to reform. The practice of two men slicing each other's limbs with broadswords for the delight of the public was given up; but bull-baiting, when dogs were hounded on a chained bull, until *he* gored them to death or *they* pinned him by nose or throat and vanquished him, still remained. The sports of the prize-ring (as it was called)—*i.e.*, boxing—were in their prime, being under the special patronage of some of the noblest in the land. And another bloody sport, among those now forbidden by law, was cock-fighting; a pastime which had so interwoven itself into the domestic habits of the people, that in certain parts of the kingdom it was practised even in the schools under the superintendence of the master, who

indeed had a special interest in keeping it up, since he became possessor of the slain birds.

Though the highwayman, with his blood-horse, black mask, and pistol-barrel protruded through the coach-window, was almost gone, yet the footpad and the housebreaker were enabled to ply their dishonest work almost without interruption. Rows of feebly twinkling oil lamps dimly lit the streets; and, while the watchman, generally selected for age and debility, was snoring in his box, or trembling with the terror of being beaten by the noisy "bloods" reeling by, belated citizens were pounced on from dark corners, knocked on the head, and robbed of all their valuables. It was a common thing for the link-boys, who ran with torches at night before a sedan-chair, to lead the bearers into some quiet nook, where, the light being extinguished, together they plundered the "fare," and shared the spoils.

The difficulties in the way of travelling, and the complete sealing up of the Continent during the Napoleonic wars, caused the Britons and the people of Continental countries to retain during this first period most exaggerated ideas of each other's peculiarities. The French caricatures depicted John Bull, the typical Englishman, as a monster like a prize ox, bloated with beef and beer, and accompanied always by a ferocious bull-dog, that growled and glared from behind its master's huge top-boots. This complimentary portrait was repaid by British artists with the figure of a lean yellow thin-shanked grimacer, known as Johnny Cra-paud, and popularly believed to live on frogs and snails. It was not until after Waterloo had opened the Continent, that these delusions began to melt, and the neighbour nations, long antagonistic, came to recognize in each other good and great qualities. This diffusion of a friendly spirit of recognition among nations is not the least of the benefits conferred upon the world by such inventions as the Locomotive, the Ocean Steamer, and the Electric Telegraph.

When the people of Britain, who had time and means to travel, found themselves unable to move beyond their own shores, they sought out some of the finest scenery of their own land. Scott, the "Wizard of the North," had just flung the light of his genius over lakes and mountains of



surpassing loveliness, hitherto unknown. And, ere long, the eagle and the red deer were scared from Katrine and the Trosachs by a stream of tourists that has grown greater every year. This has tended, among other influences, to assimilate Scotland to England. Such a change had been, indeed, progressing during the whole of the Eighteenth Century, since the time when first members of Parliament came from Scotland to sit in St. Stephens, after the Act of Union in 1707. And the publication of such works as Hume's "History of England," and Robertson's "Charles the Fifth," had startled the London critics into admiration and surprise that their language could be written with such purity and elegance north of the Tweed. But at the opening of the century people of the higher circles in Edinburgh and elsewhere in Scotland—men like Lords of Session and Sir Walter Scott—constantly spoke the broad Doric of the north, and maintained many customs peculiar to their own land. During the Nineteenth Century the process of assimilation has advanced with great rapidity. The habits of life in Edinburgh, among the educated classes, are now essentially the same as in London. The "broad Scotch" dialect has descended to the lower orders; and the English tongue is invading successfully even the Highlands, where it is now taught in many of the schools to children, whose parents know little more than Gaelic.

We can trace in the elements of the British character much that was formed and rooted before the present century. But the last fifty years have done much to abate our stiff insular prejudice, and thaw our proud insular reserve. This has been the case, not only with ourselves, but with the other chief nations of the world. We, however, being shut up in our island, and wrapped in the pride of our strength, have perhaps needed more than others the beneficial results of a free intercourse with foreign nations.

## SECOND PERIOD.

### THE FORTY YEARS' PEACE.

(1815-1854.)

THE period, extending from the Battle of Waterloo to the opening of the Russian War, has been called "The Forty Years' Peace," with that tendency to loose measurement of time noticeable in such historical phrases as the Hundred Days, &c. It was not a period of unbroken tranquillity, for, as will be seen in the succeeding chapter, violent earthquakes of Revolution shook the world, altering the constitution of leading States. But peace was the rule; war, the exception: and the period thus presents a striking contrast to that blood-stained and tumultuous time, in which our Century had its birth. The progress of Electrical invention and the extraordinary extension of Railways may be regarded as the leading features of this time.

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## CHAPTER I.

### REVOLUTIONARY WARS.

THE period of the Peace was troubled with Revolutionary wars, of which the most momentous were the Second and Third Revolutions in France, the revival of the Polish struggle, the War of Independence in Greece, and the Separation of the South American States from the Spanish dominions. These may be sketched as typical of the widespread desire for change, which took the shape of Revolution in many countries, but in our favoured island resulted only in measures of Reform.

**Three Days of July.**—Charles X., who reigned in France

from 1821 to 1830, with the blind pertinacity that characterized most of the Bourbons and the Stuarts, and one restriction after another on the people, until they were goaded into reprisals. An attempt was made to silence the newspaper press: and, when that great body, known as the *French Academy*, presented a petition of remonstrance, several of its most distinguished members were dismissed from their public posts. The disarming of the National Guard, in consequence of revolutionary crises, was another step of ill-judged tyranny. In the Chamber of Deputies, an assembly corresponding to the British House of Commons, stern speeches were made against the existing Government, then headed by Prince Polignac: nor could the lustre of military glory from the capture of Algiers, though a passion for warlike greatness has always been one of the chief elements in French character, turn the thoughts of the Parisians from the political situation at home.

Charles published three Ordinances, which, acting like fire on gunpowder, produced the Revolution. These were:—

- (1.) That the liberty of the periodical press should be suspended; and that all journals should obtain from the Government licenses, renewable every three months.
- (2.) That the new Chamber of Deputies should be dissolved, on the ground of corrupt elections.
- (3.) That the

1830 mode of election, number of deputies, &c., should  
A.D. be altered, at the will of the King. These three engines of destruction, kept a dead secret to the last,

were published in the *Moniteur*, July 25th. The journalists protested in the *Nationale*. Through every workshop and counting-house, through every theatre and *café*, the angry excitement spread. Newspapers with the protest were printed and sold in spite of the police; and shots began to crackle in the streets.

On Wednesday, 28th July, the streets were filled with barricades, made of overturned omnibuses, paving-stones, and furniture; and the tricolour flag was hoisted. The great bell of Notre Dame tolled out: and Marshal Marmont at last sent word of danger to the King at St. Cloud, where the distant firing could be heard. Rising from the card-table, Charles sent word to Marmont to put down the riot

by military force. "It is not a riot, Sire: it is a Revolution," was the reply.

The troops, left without enough of bread and already disaffected, unscrewing their bayonets, joined the insurgents in numbers. On the 29th, the fighting continued: a provisional government was formed; and Marmont was forced to leave the city. When it was too late, Charles withdrew all his Ordinances, and proclaimed his willingness to ratify the Charter; but the concession was in vain. Louis Philippe, Duke of Orleans, was made Lieutenant-general of France: and Charles fled to Scotland. The Revolution was complete (July 30).

The struggles in Greece and in South America had reached a crisis earlier in the Century. Let us first trace the revolutions, which cost Spain her South American colonies.

**Spanish America.**—It was not in human nature, especially when associated with the fiery tropical blood of the Spanish Americans, to see the United States of North America shaking themselves free of Britain, and to feel the oppressive hands of Spain growing tighter and more tyrannical as she grew feebler in power, without feeling stirrings of a desire for independence.

General Miranda, a native of Venezuela, who had been born about the time (1750) of the earliest American revolt against Spain, cherished, as the one idea of his life, the thought of freeing South America from the Spanish yoke. He painted in the most glowing colours to Pitt, the English minister, the beauty and fertility of this continent that should be rescued; and received from that minister promises of support, which the pressure of more urgent affairs prevented from being realized. Succeeding ministers looked coldly on the project of a South American Revolution; but, when Sir Arthur Wellesley was engaged in mustering his forces, it was thought to be for this distant arena.

The Bourbon royal family of Spain were on the point of setting forth for America, as the Braganzas had already done in Portugal, when the citizens of Madrid cut the traces of the carriages. The knives of the mob cut also the cords which bound the American dominions to Spain; for the authorities in these distant places were, by the exile of the

royal family to Bayonne and the confused state of Spanish affairs during the Peninsular War, left to act for themselves.

At first the spirit of loyalty to the Spanish Government was very strong; and the picture of the King was illuminated in public. But a sore dispute, not of recent origin, festered between the Europeans, who claimed all office and authority, and the Creoles, descendants of Europeans but born in the colonies, who thought, not unreasonably, that they should have a share in the government and emoluments of provinces in which they had so vital an interest. The embers of revolution began to smoulder in both Mexico and New Granada; but after a while, about 1816, the appearance of threatening disunion had vanished for the time.

Filled with a spirit excited by Miranda, and strengthened by the neighbourhood of the British at Curaçoa and Trinidad, the people of Venezuela took the decisive step of publishing a Declaration of Independence (July 11, 1811), under a Constitution modelled after that of the United States: with some important differences, however, one of which was that no foreigner should be permitted to reside in the country, except he adhered to the Roman Catholic faith. All the patriotic plans of Bolivar and Miranda, who though personally opposed appeared as the champions of liberty on behalf of the South Americans, were

**1812** paralyzed by a double earthquake, which set the steeples rocking, and, while their bells rang wildly, the trembling earth opened; houses fell with a widespread crash, and piercing shrieks issued from the cloud of dust that covered what had been a city. Appalled by this calamity, which priests dexterously turned into a judgment, the people shrank from their new Constitution, and once more the Spanish rule predominated. Arrested and ironed, Miranda died in a Spanish prison.

But Bolivar continued the struggle; and after many vicissitudes of fortune, as the Spaniards or the Patriots attained the upper hand, he succeeded in driving the Spanish troops out of this province in 1823. Four years earlier, he had established the independence of New Granada.

In succession, Paraguay, La Plata, Chili, and Peru gained their freedom, preferring the republican form of government

in their new organizations. Of these States Chili has since maintained the foremost place ; and has more than once measured strength with Spain herself.

In 1823 Great Britain, whose Foreign Minister then was Canning recognized the independence of the American republics by sending consuls thither to protect the interests of our trade.

**Grecian War of Independence.**—The discontent of the Greeks under the oppression of their Turkish masters came to a crisis of revolution during the third decade of the present century. It had long been smouldering and bursting out in fitful flashes. One of the most decided of these was the Suliote insurrection of 1790. These Albanian mountaineers, whose valour excited Lord Byron's enthusiasm,—

“ Oh ! who is so brave as a dark Suliote,  
In his snowy camese and his shaggy capote,”—

rose in the hope of receiving aid from Russia, that ancient and inveterate foe of the Sublime Porte. Nor were their hopes groundless, for they had received encouragement from the North. But the Russians gave them little real aid : Prince Constantine did not accept the crown they offered ; and the insurrection did little more than afford these daring mountaineers an opportunity of displaying among their native rocks that valour, which was so conspicuous a quality of Greeks in the olden days. Gathering a squadron of ships at Trieste, they gave evidence of their ability to fight at sea also.

During the succeeding years the Greeks gained a position in commerce, which rekindled in them the spirit of enterprise and made them masters of a fleet of well-equipped merchantmen. Learning, especially the knowledge of the old Greek writers, was cultivated anew. And the patriotism of the people took the shape of a secret society, called *Hetairia*, which spread its branching roots far and wide among all ranks of the people. At meetings held at the dead of night, new adherents were sworn on their knees to obey all the laws, and never to divulge the existence of the association under peril of death.

Matters were in this condition, when the rebellion of Ali

Pacha of Janina against the Turkish Government gave the Greeks an opportunity of beginning their struggle for independence.

At Jassy in Moldavia Greek independence was proclaimed, and a force of patriots took the field. But the rising was a brief blaze of valour; not the outburst of the full flame. It ended in disaster for those concerned, but afforded some splendid examples of devoted valour. In the Convent of Secka a chief-tain, named George of Olympus, resisted the Turks for six-and-thirty hours; and, when his followers preferred flight to the gallant fate, sword in hand, to which he strove to persuade them, he blew himself up, after praying for his country and himself.

Kalavrita, thirty miles south-east of Patras, was the scene of the great uplifting of the Grecian banner. **1821** Patras was then burned; and the fire of insurrection spread rapidly over the whole Morea. **A.D.** Athens was soon seized; and the port of Missolonghi in the west became a centre of action. There were two leading spirits on the Grecian side. These were Demetrius Ypsilanti, who had hurried from Russia, and Mavrocordato, who had come from Italy, on receipt of the tidings of insurrection. But among the Greeks there was no union; bickerings and jealousies bade fair to mar all the efforts of patriotism for the welfare of the unhappy land. This state of matters, indeed, was a characteristic feature of the whole struggle; and Greece is not yet free from the horrors and perils of faction.

An assembly, held in 1822 at Epidaurus, appointed Mavrocordato President of the Republic; and victory soon crowned the arms of Greece, Omar Pacha being beaten at Missolonghi.

The conduct of the Turks was not such as to excite much sympathy on *their* side; for they drenched the quiet vineyards of Scio in the blood of massacre: in reprisal for which the admiral's ship was burned by Canaris and Miaulis, two of the brave Greek sailors who sprang from this time of peril. The West of Europe was now beginning to awaken and kindle with sympathy for those engaged in so heroic a

struggle: men began to call themselves *Philhellenes*, to collect funds, and, in some cases, to join the Greek insurgents in person. The most celebrated of those who took the personal mode of declaring for Greece was the misanthropic poet Byron, whose devotion to this land of old renown flung a lustre over a portion of his life, much lacking in lustre. At his own expense he raised and maintained a regiment of Suliotes; but his exertions were cut short by a fatal fever (1824).

In the same year Phrya was assailed by the Turks; and, the cause of the Greeks growing desperate, six hundred men of Olympus imitated the heroism of Chieftain George. After they had defended the Convent of St. Nicholas until only one-third of their number survived, they struck their flag in apparent signal of surrender: but, when the exulting Turks came swarming over wall and rampart into the crumbling building, up went a white flag on which in black letters were the words, *Liberty or Death*; and a terrific explosion hurled Greeks and Turks in one charred and mutilated mass into the air. The devoted men had set fire to the powder magazine.

In the autumn of 1825 Reschid Pacha appeared before Missolonghi, within which five thousand Greeks were stationed as a garrison. He raised mounds and dug mines, all in vain. After bombarding the walls the besiegers tried more than once to force a way into the breaches of the rampart; but the gallant Greeks poured out, and drove them back in confusion to their camp. It was necessary to try a greater soldier. In January 1826 Ibrahim Pacha with his Egyptians advanced to the city; but for a time the same fate befell his stormers, who were driven back 1826 by the Greek sword and bayonet. The Turkish A.D. fire at length mastered the forts that commanded the lagoons next the sea, by which supplies reached the city. This was fatal to the defence. Starvation set in; and then there remained no resource but to attempt the desperate expedient of cutting a way through the beleaguering army. Dividing into two bands, they made the effort in the moonlight. One portion, musket in hand and with sabres slung to their wrists, dashed into the Turkish trenches, and cleared



them; the other, more timid, was broken. A few saved themselves by wading through the lagoons.

In spite of such scattered acts of heroism, internal dissension all but ruined the cause of Greece. While Ibrahim was ravaging the Morea, no fewer than *seven* contending factions were struggling for supremacy in Greece.

It was the interference of the Great Powers—Britain, France, and Russia—that saved Greece from the fate of Poland. By a Protocol signed at St. Petersburg in 1826, these Governments arranged that Greece was to remain tributary to Turkey; but that the Greeks were to manage their own political affairs. This arrangement the Sultan refused to accept; and the fleets of the Allies sailed into Grecian waters.

Ibrahim Pacha with the Egyptian fleet entered the harbour of Navarino to join the Turkish squadron there. Sir Edward Codrington, the British admiral, warned him not to venture out; and an armistice was concluded, upon the Egyptian giving his word that his ships should not leave the harbour for twenty days. This arrangement he violated; and the three admirals then drew a close guard round the imprisoned ships. The Turks fired on a boat; and then the action of Navarino fairly began. For four hours  
**Oct. 20,** the cannon roared, until the Turco-Egyptian fleet  
**1827** was a mass of wreck; and 6000 of the sailors had  
**A.D.** been killed. In the following year (1828) Ibrahim Pacha evacuated the Morea.

Though this may be said to have terminated the Greek War of Independence, the affairs of the new kingdom were far from settled. Nor did Turkey yield or cease the struggle, until in 1829 a Russian army penetrated to a point so near the Turkish capital that it was only by agreeing to the terms of the Treaty of London that the peril could be averted.

The President of Greece, Capo D'Istria, had strong tendencies in favour of Russia, and made a strong effort to gag the press. The discontent grew great; and a rising occurred at Poros, where the Russians were met with vigour. The assassination of Capo D'Istria at a church door (1831) removed one cause of these later troubles.

It was not until 1833, that Otho of Bavaria accepted the crown of Greece, which had been previously offered to Prince Leopold of Saxe-Cobourg.

**Polish Revolt of 1830.**—The oppression of Russia goaded the Poles to revolt in 1830. The Grand Duke Constantine, acting as commander-in-chief of the Russian forces, was a tiger in his ferocity. His spies lurked everywhere. It pleased him to kick women and shave their heads. He treated men to tar and feathers on the slightest provocation. By censorship of the Press, by vexatious drill, by forbidding the debates of the Diet to be published, and by trampling ruthlessly on the national spirit of a gallant people, he excited them to the verge of revolution. The students of Wilna and Warsaw were especially excited; and, when the French Revolution broke out, like an electric spark the example raised the students into a flame of premature outburst, which came with all the more fury because the insurgents had already lost a great opportunity of fighting for freedom, when in 1828 the Russian army was in trouble on the Danube.

A little knot of students of the military school formed the bold design of seizing Constantine in person. About seven o'clock in the evening they made a rush towards the Belvedere Palace, into which they burst, wounding and killing several of the guards. Constantine, who was enjoying a sleep in his bed-chamber, was startled by the noise, and managed to escape by the window, half-dressed as he was, and get over to the barracks of his Russian Guards. Baffled in their attempt, the students gathered in a mass on the Sobieski Bridge, where they succeeded in defeating the Russian guards. Then through the city, in **Nov. 29,** theatre and café, rang the cry, "Women, to your **1830** homes; men, to arms!" At a rush the arsenal **A.D.** was stormed; and muskets passed from hand to hand till the city was in arms. And ere midnight the soldiers had joined the Revolution in numbers, which might well make Russia pale.

The time for Polish freedom, however, had not yet come. Gathering all their strength, the Russian eagles swooped down fiercely on the defenceless land. For a time the cause

of Poland looked bright. At Grochow in February, and at Ostrolenka in May, 1832, the insurgents signally defeated the Russian forces. But Paskewicz, grimly concentrating all the soldiers available upon Warsaw, surrounded the gallant Poles with a ring of fire, and in three bloody days (Sept. 5th, 6th, 7th) shattered all their hopes for the time. We shall read of another Polish struggle in 1848. Aided by no material resources from without, and utterly undefended within by any physical barriers, the men of the fruitful corn-plain wet their native soil all in vain with gallant blood. If Poland had a mountain-nest, such as Greece, Switzerland, and Scotland possess, her liberty would scarcely have been lost; or, if that disaster had happened, a strong hope of regaining freedom might well have been cherished for her. But she lies naked to the foe, with no lines of defence except those afforded by the curves of her great river.

## CHAPTER II.

## POLITICAL CHANGES.

THE tendency of the Nineteenth Century towards a liberalizing policy is apparent. The history of the **Catholic Relief Bill**, commonly called "Catholic Emancipation," shows this clearly. It is undoubted that—especially in Ireland—most grievous laws had long been pressing on our Roman Catholic fellow-subjects with appalling severity. And these went far to explain the chronic discontent, which kept the embers of rebellion always smouldering in that island. There were laws, which deprived a father of authority over his own children, and condemned to death a priest of the Roman Catholic creed who married one of his own sect to a Protestant.

The burden combined with real and imaginary political grievances to excite a rebellion in 1798; and the Irish problem—most vexed question of the century—continued to embarrass and puzzle the foremost English statesmen.

The Act of Union—perhaps the most beneficial measure ever enacted with regard to Ireland—came into effect in 1801, and was coupled with a promise that the Catholic disabilities should be removed.

But time passed. Pitt died and Grattan died; and yet the work of emancipation remained undone. At last agitation grew so hot in Ireland that, to avert a rebellion, the question was taken up in the Imperial Parliament. Daniel O'Connell, an Irish demagogue, was returned to serve for Clare; and thus the agitation was carried into the heart of the Legislature.

On the 5th of March 1829 the battle began by Mr. Peel, in a speech of four hours, which drew down thunders of applause heard far beyond the limits of the House, proposing a measure to relieve the Catholics. It threw open to them

all offices except the Regency, the Lord-Chancellorships, and the Viceroyalty of Ireland—the Church, universities, and schools being of course guarded. Then, as restrictions, no Episcopal titles were to be used by Catholics, and the number of monks and Jesuits was to be limited. When the Duke of Wellington, in the House of Lords, declared that, “to avert one month of civil war from his native land, he would lay down his life,” it was felt how great a crisis had arrived, that could draw words of such weight from the man who, of all others, had seen most of war. When the Bill had passed the Houses, the King, now broken in health and childish in mind, gave his assent with bitter unwillingness ; and on the 13th of April 1832 the Bill became law.

The passing of the **First Reform Bill** was a kindred measure, extending the franchise, or right of voting, and altering the distribution of seats. While Earl Grey was Premier, this celebrated measure was first laid before the Commons (March 1st, 1831) by Lord John Russell, its provisions having been kept a profound secret until that night. Intense was the interest felt by the country ; and on that evening at many a late dinner-table, and on the next day in many a remote parish, men congratulated one another, as they discussed the unfolded Bill, that the “rotten boroughs” were doomed.

After the first reading, which took place on the 14th of March, the working-classes began to agitate in favour of Reform by assembling in great processions, and forwarding petitions. But there was a strong opposition to overcome ; and on the second reading (March 21st) the Ministry had a majority of only *one* vote. They were twice defeated in committee ; and the King soon saw the necessity of consenting to dissolve Parliament, and appeal to the country for the settlement of the question. So eager did His Majesty become to meet the grave crisis, that he would scarcely wait until his carriages should come to convey him to the House of Lords. “A hackney-coach will do,” he cried. And, when the Lords and Commons were still engaged in making speeches about the great subject, the thunder of cannon announced the approach of the King. Summoned by Black Rod, the Speaker and the members of

the Commons hurried to the bar of the Lords ; and William spoke the sentence of dissolution.

There was then a general election, in which the artisans, especially those banded together in the political Unions, formed in the great centres of manufacture, took a share of more than usual interest. But the feeling in favour of Reform was not confined to the working-classes ; it penetrated the middle-class in general ; and a House of Commons was returned, in which the Ministry had a large majority. Over the Second Bill there was a new and hotter fight, during which the Opposition tried hard to weary out the patience of their foes by protracting the discussions in committee far on into September. But the members held together ; and the Bill passed the Commons. However, it had greater perils to encounter in the Upper House, where, after a fierce debate of five nights, it was thrown out (Oct. 7) by a majority of 41, 20 of which were the votes of bishops.

It seemed then as if England was fated to suffer from a hurricane of Revolution, like that which in the previous year had convulsed France.

The popular agitation now rose to fever-heat. At Birmingham and other great cities meetings were held, in which men declared that they would pay no taxes until the affair of Reform was settled ; and menacing things were spoken of the Lords, who "dared" to obstruct a great national measure. The desperadoes of society broke windows, and flung stones, as they delight to do ; but these were not a tithe so dangerous as the vast masses of respectable workmen, who awaited with stern resolve their time to act. Riots, probably stirred up by rogues in hope of spoil, took place at Derby, where the mob broke open the jail ; and at Nottingham, where they burned the Castle. But more fearful scenes were enacted at Bristol, a city swarming with a population of low sailors and their hangers-on. The entry of the Recorder, Sir Charles Wetherell, who had opposed the Bill, drew together a riotous mob, that amused themselves with stone-throwing ; but next day the fury increased. Armed with cudgels and iron-railings, a band of drunken rioters smashed and burned several public buildings, and filled the city with tumult, which was but tardily repressed by the

soldiers. Such occurrences showed the temper of the public mind.

The Parliament met on the 6th of December 1831, amid clouds of discord and suspense. The political Unions, now grown to a size and power most alarming, were meditating a great National Union, before which the Peers seemed an insignificant handful. "Revolution" was the terror of the time; and amid the general gloom there were ominous whispers of the approach from the East of a new and terrible visitor, "the Cholera."

On the 12th of December Lord John Russell introduced the Reform Bill for the third time; and before Christmas it had passed its second reading in the Commons by a majority of 486. After it had been debated, clause by clause, in committee, Lord Mahon made a last desperate attempt to shelve the Bill; but in vain. It passed the Commons by 116 (March 21st, 1832).

The House of Lords was now divided into three sections—a party *for* the Bill; a party *against* the Bill; and the Waverers, whose movements no man could foretell. The debate on the second reading lasted for five nights; and the morning sun was high on the 14th of April before the division took place. The Bill was passed by a majority of *nine*.

There was then a great mustering of the Unions, which the Government had vainly endeavoured to find illegal; and, on the other hand, the Duke of Wellington was quietly preparing his soldiers to act, if the people rose. Upon the King's refusal to create a number of new Peers sufficient to carry the Bill, the Grey Ministry resigned; and Wellington and Lord Lyndhurst tried in vain for some days to form a Tory Cabinet. Throughout the country the news of the Grey resignation was received with sorrow. Muffled bells were rung; crape was hung over the King's face on inn-signs; and ropes were seen round the neck of the Queen's statues, for she was supposed to be the instigator of King William's obstinacy.

Still the Unions declared their resolve to pay no taxes; and still in the Birmingham barracks the Scots Greys waited, booted and saddled, and on one day rough-sharpening their swords "to inflict a ragged wound,"—a thing they

had not done since Waterloo. It was expected that a vast multitude from the combined Unions were resolved to show the light-blue rosette, which had come to be their political badge, in London. And it was feared that the military would try to impede their march. At this crisis the joyful news came that Earl Grey had been recalled to the Premiership. The King wrote a letter to the Waverers in the Lords, which, coupled with his known resolve to create a new batch of Peers, sufficient in number to carry the Bill, had the effect of securing the safety of the measure, which accordingly passed its third reading, and, by the signature of the King, became law (June 7th, 1832).



## CHAPTER III.

## THE ABOLITION OF NEGRO SLAVERY.

BEFORE the end of the Eighteenth Century an active and philanthropic mind was busily at work upon the great problem, "Is it not possible to emancipate negroes from slavery in the British dominions?" The heart of William Wilberforce, the son of a Hull merchant, and of a delicate constitution from his earliest days, had been painfully impressed, even during the school-life of the boy, by the narratives of suffering among the negroes, whom an unhappy fate condemned to slavery. And, when the boy grew to early manhood, and found himself at twenty-one member for Hull, and at twenty-five representing the largest county in England, he saw a sphere opening before him, in which he might find scope for putting his boyish dreams of philanthropy into some practical form.

One talent he had, the gift of oratory, which had discovered itself in early days in the tasteful elocution of the school-boy; and another source of power lay in his resolution and perseverance. Add to this, deep religious convictions, first stirred by the preaching of Whitefield; and the sum will present the qualifications of this eminent man for the gigantic task which he had undertaken. He had, moreover, the advantage of intimate association with the younger Pitt and the foremost statesmen of the day.

It is wonderful what one man, whose mind is saturated with *one* grand idea, whose will is steeled to the accomplishment of *one* great purpose, can do towards effecting his object. In the House and at the dinner-table, in the company of distinguished statesmen or obscure Dissenting ministers, in his speeches, his letters, his familiar talk, we might almost add, his dreams, the one thought kindled him. "Set the negro free; destroy for ever the accursed traffic in human

flesh ;"—this was the unfailing burden of his sayings ; the one lever of his life.

He found an assistant of rare enthusiasm in Thomas Clarkson, a Cambridge man, who had gained a prize for an essay on the subject,—“ Is it lawful to make slaves of men against their will ?” In collecting material for this purpose, he was horrified to read the dark tales of misery connected with the subject ; and was so excited to action that he laid aside all thoughts of the Church, for which he had been preparing, and devoted himself heart and soul to the cause of the Negro. It was he who, as the agent of an Anti-Slavery Society formed by the Quakers, excited the minds of the public outside the House of Commons in behalf of the negroes, while Wilberforce pleaded their cause trumpet-tongued, within.

The first movement in this great and philanthropic work was a petition presented to Parliament in 1783 by the Quakers. In 1787 Wilberforce pressed it upon the House so strongly that his friend Pitt took up the question with a view to settlement ; but it lingered still. The health of Wilberforce gave way ; but he clung all the more fondly to his darling project ; and at last achieved success—but not until the question had entered the Nineteenth Century.

In 1807 Lord Grenville brought into the House of Lords a Bill for the Abolition of the Slave-trade. It was supported by many eminent men, including Henry Brougham, who turned the force of his terrible oratory upon the slave-owner and the slave-dealer ; but it was opposed by a most influential body of men, including the members of the royal family, and all the Liverpool merchants, Jamaica planters, and London ship-owners. In reply to the pictures drawn by those who argued for abolition,—the raid upon the negro village—the separation of children from their agonized parents—the horrors of the hot and fetid hold in the slave-ship—the brutalities of the slave-market—the raw flesh starting under the cruel lash—and all the woes of slavery,—the Opposition painted the terrors of a negro insurrection, the collapse of West Indian commerce and prosperity, the wide-spread bankruptcy and ruin that must ensue from the stoppage of the trade. In spite, however, of

1807

A.D.

the latter party, the Bill passed the Lords, and soon after floated triumphantly through the Commons too. Wilberforce was cheered to the echo on the announcement of his triumph, and was surrounded by friends who wrung his hand in congratulation. It was arranged that all trading in African slaves was to cease after January 1st, 1808. This, it must be noticed, was a different thing from the emancipation of those already in slavery—a change for which the national mind was not yet quite prepared.

Wilberforce next devoted himself to the task of inducing other States to follow the example set by Britain; and in every complication or new situation of our foreign politics during a most exciting time, his first object was to turn every change to the benefit of the negro. The restoration of the Bourbons, the visit of the Allied Sovereigns to London, the Congress of Vienna, were seized on and made subservient to this great end.

On his retirement from public life in 1822, he confided the cause of the negro to the able hands of Mr. Fowell Buxton. In 1823 this gentleman moved a resolution for the *gradual* emancipation of all slaves in the British Colonies. He was opposed by Mr. Canning, who carried resolutions for improving the condition of the slaves, in order to fit them for freedom at some future time.

A Circular, embodying these resolutions, was then sent out to the West Indies. It distinctly forbade in future the flogging of women, and the use of the whip in the field. Bitter indeed was the reception of this document by the planters, who saw no way of keeping down the blacks but by the knotted thong. Jamaica talked of declaring herself independent; and a wide-spread feeling of discontent arose in all the colonies. It was, however, in Demerara that the most unhappy results occurred.

The planters in that colony made no secret of the purport of the circular from home; and, as is natural among the ignorant, a rumour ran through the cabins of the negroes, wildly exaggerating the terms of the document. Orders had come to set them free, they thought, but the masters had combined to prevent the fulfilment of the command. Disaffection, growing red-hot, would have ended in massacre,

but for the influence of a missionary of the Independent Church bearing the plain name of John Smith, who used all means in his power to keep the blacks from breaking into lawlessness. Nevertheless he was arrested and imprisoned by the Governor ; and, sinking under the hardships of confinement, died a martyr to the cause of the negro.

The West Indies continued to be in a most unsettled condition during the next ten years. The slaves heard in a desultory way of the movements that were making in their favour, and exaggerated the rights they supposed themselves to possess : the planters, irritated at the interference of Government in laying down restrictions for the treatment of their slaves, spoke and acted so insolently on one occasion that the people of Trinidad reached the length of proposing to pay no taxes. As a natural result of all this, the sugar-crop was neglected ; the West India merchants in London saw themselves in embarrassment, with the prospect of probable ruin looming before them ; and all agreed that it was full time to bring the vexed question to a final issue. Petitions pouring into Parliament spoke out the feeling of the nation in the matter in a way most unmistakable.

Buxton was still at his post, resolute as steel, and armed to the teeth with facts. Lord Althorp, echoing Canning's resolutions of 1823, was willing enough to temporize—to prepare the slave *gradually* for freedom, and so forth. But temporizing would not do now. Already in the United States of America, Garrison, in the *Liberator*, was devoting himself nobly and unselfishly to the great cause of abolition ; and the state of things in the West Indies, arising both from the suspense of the unsettled question and from the losses caused by a great hurricane, was such as to admit of no delay. Mr. Stanley, then Colonial Secretary, made certain proposals towards emancipation, of which the following were the principal : (1.) That all children born after the passing of the Act, and all then under six years, should be free ; (2.) That field-slaves should be apprenticed for twelve, house-slaves for seven years ; (3.) That a loan of fifteen millions should be given to the planters as compensation.

Mr. Buxton saw in these resolutions signs of success ; but he resolved to obtain better terms for the negro. At last the

battle ended, the loan being changed into the magnificent gift of *twenty* millions, and the period of apprenticeship being reduced from twelve and seven to seven and five years. The Act passed the House of Lords in August 1833; and on the 1st of August 1834 there was not a slave in the British possessions. The apprentice-system, however, was a failure; the masters were unwilling to relax the severe discipline of older days; the negroes, seeing freedom at hand, were harder to manage; and the upshot of this condition of affairs was the complete abandonment of the apprentice-scheme.

The moment of Emancipation was fraught with intense interest; and the features of the scene have been sketched with dramatic force:—

“In Antigua, at the first stroke of midnight from the great Cathedral bell, all fell upon their knees, and nothing was heard but the slow tolling bell and some struggling sobs in the intervals. The silence lasted for a few moments after the final stroke, when a peal of awful thunder rattled through the sky, and the flash of lightning seemed to put out the lamps in the chapels. Then the kneeling crowd sprang to their feet, and gave voice to their passionate emotions—such voice as might be expected from this excitable people. Some tossed up their free arms, and groaned away at once the heart's burden of a life. Some prayed aloud after the lead of their pastors that they might be free indeed. . . . The rest of the holiday was spent partly in mirth, and partly in listening to the addresses of the missionaries. On Monday morning they went to work—that work of which they were now proud, for it was work for wages.”

In the Third Period it will be necessary to refer again to Negro Slavery in connection with the results of the recent American War.

## CHAPTER IV.

## OCEAN STEAMERS.

IN the days of ancient history Phœnician mariners, sailing under the shadow of the Pillars of Hercules, looked with awe out upon the dark billows that came rolling in from the unknown West. To them that trackless sea represented the barrier of the world, beyond which lay "Chaos and old Night;" and after creeping along its edge, as far as the lands rolled in mist, where the very shores were strewn with masses of precious tin, and where, twice a day, the waters swelled up and subsided on the beach, they gladly found themselves safe again on the blue and tideless sea, that washed the strands of Tyre and Carthage, to them familiar and dear.

As centuries rolled on, the Ocean, which lay waiting restlessly for the work that Time was to bring, lost some of the awe that had at first invested it. Men began to "lay their hands upon its mane" with comparative fearlessness; and, when steering by the stars had ceased to be, and the marinal, as we used to call our sailors, went forth, often in darkness and in storm, armed with that needle trembling on its compass-card, which East gave to West in the days of the Crusades, it became a matter of slight moment to lose sight of land and breast the western waves.

Then came Columbus, the magnificent dreamer, who pored over his maps and charts and books of geographical and astronomical speculation, until the one fixed idea filled his brain, that there was a World to seek beyond that dark flood and its leagues of floating weed. The voyage of 1492 came to a gloriously successful end. Cabot and Cabral, Cartier, Hudson, and a hundred more, shaped out the coasts of the new-found land that lay beyond the setting sun. The ships of Portugal crept along the African sea-board, until the

cloudy summit of Good Hope arose : and thus THE ATLANTIC became a thing of human knowledge, panting to bear the burdens of Commerce, for which it had been waiting from the dawn of Time.

History tells us how Spain flung golden fetters over the southern continent of America ; how the *Mayflower* bore men with their Bibles in their breasts to the edges of the unhewn forests ; how the green billows were soon covered with white-winged ships speeding on various errands, some of peaceful enterprise, of Christian charity, but some, alas ! of hideous traffic in human flesh ; how the waters crimsoned with the flashing of Blake's and Anson's guns ; how, in short, this vast Ocean, girt with spreading seas, came to be a central scene of European traffic and contest.

But it was reserved for the Nineteenth Century to witness the triumph of two great achievements of scientific and mechanical skill, which made this great sheet of water more available for the uses of commerce and communication. The Ocean Steamer and the Ocean Telegraphic Cable brought the New and the Old Worlds into close and constant intercourse. Of the latter an account will be given in a future chapter.

The first steam-boat, that plied regularly across the sea, was the *Rob Roy*, a ship of 90 tons, placed by David Napier of Glasgow on the passage between Glasgow and Belfast. This was soon followed by others. The *City of Edinburgh*, with a burden of 400 tons, began to ply between Leith and London in 1821. But this was mere creeping along shore. The great problem was to face the open ocean.

The honour of having first achieved this perilous enterprise was won by the *Savannah* (350 tons), which  
**1819** made the voyage from New York to London in  
A.D. twenty-six days. In 1825 the *Enterprise* reached India by sea.

Those, however, were but straggling pioneers of the great army of ships propelled by steam, which were soon after to plough the sea.

The problem of establishing a regular ocean-traffic was solved in 1838, when the *Sirius* (700 tons) started from Cork, followed a few days later by the *Great Western* from

Bristol. On both sides of the Atlantic the excitement was great ; for steam would avoid all the delays and some of the dangers to which sailing-vessels were exposed. There was some intention at first of stopping half-way at the Azores, but the idea was abandoned. Right on to the American port they held their way ; and on the 23rd of April the smoke from the funnel of the *Sirius* began to darken the horizon, eagerly swept by the glasses of the New York people. The *Great Western* was only a few hours later. Joy-bells rang ; gay flags fluttered ; cheers and music greeted the triumphant ships. The voyage of the *Sirius* had occupied nineteen days ; the *Great Western*, a vessel of larger tonnage and better build, accomplished the voyage in less time.

Then was built as an experiment a monster vessel, the *Great Britain*, an iron ship with six masts and wire rigging. She made the voyage to New York in about fifteen days. The method of propulsion adopted in this great ship was the screw, in place of the paddle-wheels. It was found that the paddle-wheels took up too much room ; that towards the close of a voyage, when the consumption of coal had lightened the steamer, they took too slight a hold upon the water ; that if the ship rolled, one paddle beat the air uselessly, while the other churned the sea ; and that in war they were easily crippled by the shot of the enemy. The idea of the screw may have been suggested by the vans of a windmill, which catch the air obliquely : the invention was due to Bernouilli of Groningen, who proposed in 1752 to apply such propellers to a ship.

The largest ship ever built may be described here, although her history belongs more particularly to the succeeding period. Begun in 1854 at Millwall by Mr. Brunel, the *Leviathan*, afterwards named the *Great Eastern*, was finished in 1857 by Mr. Scott Russell. Her length is 680 feet ; her burden, 23,000 tons. Although the comfort to passengers of making the Atlantic voyage in so vast a ship is very great, owing to the almost entire absence of oscillation or rocking in high seas, yet this vessel has been a commercial failure. A succession of accidents occurred, which gave the *Great Eastern* an unlucky name ; and at length, the liabilities of the company increasing, she was sold



for £25,000,—“scarcely one-third of her value as old materials.”

Side by side with the construction of ships advanced the construction of the marine steam-engines to propel them. Foremost in the improvement of these have been the Penns, father and son. The former, beginning life as a poor mill-wright, had raised himself by sheer genius to a high position, which his successors maintain and have extended. One of Penn's great achievements was the invention of *oscillating* engines, which only weighed one-half, and filled one-half the space, of the engines—called *side-lever*—previously in use. It was believed at first that the oscillating principle could be applied only to small engines; but Penn, devoting his brain to the problem, succeeded in constructing engines of 500, 600, and 800 horse-power, for the *Sphinx*, the *Victoria* and *Albert*, and a yacht for the Pacha of Egypt. For war-ships, which require the engines to lie below the water-line, so as to be safe from shot, the Penn foundry has turned out engines reaching 1350 horse-power. These are styled *trunk-engines*, and are fitted for the screw.

As one of the wonders of modern mechanical labour, we may add a sketch of the Penn Engine Works. That establishment at Greenwich, covering seven acres and employing 1300 hands, is devoted to the making of the engines. There is a separate workshop for the construction of each part of the engine, and these are afterwards all united in the fitting-room.

The casting of a cylinder, for which twenty or thirty tons of iron are sometimes used, is a striking scene. Melted in great cupolas, the iron, which is picked in order to produce as perfect a piece of work as possible, is sluiced off into two great caldrons in the foundry. Lever-wheels tilt these up on one side, and the molten metal, glowing white as the dazzling sun, and filling the air with jets of star-like fire, is most carefully poured into the holes in the top of the mould, under the guidance of the chief founder, whose presence is necessary for the safety both of the cylinder and the on-lookers.

Steam-boats now swarm on the seas and the navigable rivers of all civilized countries, and traverse the great oceans

of the world. On the Thames—where at the opening of the century the waterman, with red coat and pewter badge, plied his oars from one river-stair to another—busy little steam-boats, with every square foot of deck covered with passengers, puff up and down; and the Clyde, the Hudson, and other great streams present a similar picture. The Mississippi is a great highway for steamers, racing along, often with funnels red-hot. But the Ocean Steamers represent the chief triumphs of this great invention. By means of them an English traveller can, almost in spite of winds and currents, reach America in ten days, India in thirty, and Australia in about sixty. Indeed, to encourage excursions, the system of return-tickets has been introduced for even these long voyages.

## CHAPTER V.

## THE WORKING-CLASSES AND THE CORN LAWS.

WHILE the mind of the nation was in turn agitated by the discussion and settlement of such great questions as Catholic Emancipation, Parliamentary Reform, and the Abolition of Negro Slavery, there yet remained a subject for the genius of the statesman in what came to be called "the great political gangrene" of the time. This was the condition of the Working-Classes, as the lowest section of our population is wont to be termed.

The Poor Laws remained in much the same condition as when they had been enacted in the time of Elizabeth ; and although the advance of civilization during more than two centuries cannot have failed to lift this section of society to a somewhat higher level of comfort, there were many evils to be redressed yet. In the adjustment of wages, the cheapening of food, the spread of education, the improvement of dwellings, there remained a Herculean task yet undone.

The discontent of the working-classes took a most foolish way to display itself. In the manufacturing districts, enraged at the introduction of new machines, which were to supersede the labour of the hands, the mill-workers banded together, and in many places destroyed the things they hated so ignorantly and powerlessly. And in a similar fashion the peasantry, rendered fierce by want of food and insufficient wages, set fire, night after night, to the corn-ricks in the farmyards of Kent and elsewhere. The story told was always much the same. A shabby stranger would

**1830** be seen lounging about the place at dusk ; none

A.D. saw him come, none saw him go ; but the darkness had scarcely fallen when a strange blue light began to flicker among the stacks ; a line of fire would then run rapidly along the ridge of the rick, and out burst sheets of

destroying flame. It was whispered that these unknown incendiaries poured some inflammable liquid—of the Greek-fire species—on the corn they intended to destroy.

Then many a fine young peasant ran through a course, which led him to prison or to Botany Bay. Goaded in his cottage by the looks of his pale wife and hungry children, whom he often saw fighting with the pigs for a piece of rotten turnip, he betook himself to the ale-house; and meeting there a gang of desperadoes on the outlook for recruits, would blacken his face, and go prowling after hares and pheasants in the neighbouring preserves. An affray with gamekeepers was sure to follow; and the least guilty being left in the lurch, as usually happens, he was tried for the murder of a watcher who was shot in the struggle, in all likelihood by some villain now safe in hiding. Convicted of manslaughter, he was sent beyond seas to work out his term of punishment, while his wife and children fell as a heavy burden on the parish.

The evils of the law pressing on the poor, who in 1832 amounted to seven millions, were always on the increase; for the funds of the nation were lavished on the idle and the vicious, while honest poor men, working their fingers to the bone rather than lose their sense of independence and come upon the parish, were ground down with the heavy taxes levied for the support of such. The poor man was taxed to support the pauper, who got a weekly allowance of aid.

The necessity of legislation was a subject, on which all classes that ought to have a voice were agreed. The principles, on which the new law—called the Poor-Law Amendment Act—was based, were the cessation of home relief and allowances, and the establishment in every district of a Poor's-House, to which all paupers were obliged to go, and in which they were forced to work for their maintenance. A Central Board, controlled by Government, was to direct the working of the Act throughout the country.

Lords Russell and Althorp introduced a Bill, Aug.  
which passed the Houses and became law, in spite 1834  
of the defection of the *Times*, which veered round A.D.  
in a single day to the opposite point of the compass,  
and became a most determined opponent of the measure.

In the course of the debates upon this subject, the necessity of abolishing the Corn Laws as a means of giving relief to the poorer classes of the community was mooted; but Lord Melbourne's Government, to whose lot it fell to set the Act in operation, exclaimed—so short-sighted are statesmen even!—that “it would be the maddest thing possible to abolish the Corn Laws.”

An inquiry into the condition of factory children was a kindred movement, made in 1833. These poor little “white slaves” were forced to work, standing, in an atmosphere fetid and thick with the floating flue, for ten or a dozen hours, until their limbs often became swollen, their spines distorted, and their whole growth stunted. Parliament took up the clamant case; and an Act was passed, limiting the hours of labour under eleven years of age to nine hours, and decreeing that, except in silk-mills, no child under nine should be permitted to work at all. Arrangements were also made for the deduction of a small amount—one penny in the shilling of wages—to provide elementary education for these young operatives; but this deduction was to be made only if the mill-owner wished to let his work-people pay for what he should provide of his own accord. Inspectors were appointed to visit the factories, and see the provisions of the Act faithfully carried out. This subject has engaged the attention of Parliament since, and certain improvements have been made in the factory system.

In 1834 a movement of the working-classes arose in connection with an alleged injustice done to some Dorsetshire labourers, who were transported for administering an illegal oath in the formation of secret agricultural unions. These spread poisonous roots throughout the rural districts, while trades-unions were ramifying through the centres of manufacture. A day (April 21, 1834) was chosen for a great meeting of trades in Copenhagen Fields. Some of the leaders spoke wildly of seizing the King, Queen, and Premier; of securing the Bank and the Tower, &c. But the Duke of Wellington was ready. Cannon and soldiers lay quietly waiting for an outbreak, which, however, never came. The crowd received a hint that no petition could be received backed by so threatening a demonstration; and

a gaudy vehicle of red and blue carried the document ignominiously away, until a small deputation should be appointed. The convicted labourers received a pardon as a result of this gathering.

A murmur of discontent continued during 1835 and the following years to come from the agricultural districts, where farmers and labourers were alike discontented. Members of Parliament had their talk and their theories on the subject—one doubting whether direct taxation should be reduced; another thinking that the panacea lay in “a silver standard, or conjoined standard of silver and gold.” But the distress continued; and, when King William IV. died, his young niece Victoria came to a throne overhung with clouds of domestic gloom, which grew deeper about the time of her marriage, when all should have been smiling.

It was evident that a struggle was approaching between the landed proprietors and the labouring classes with respect to the price of corn. Four magnificent harvests in succession (1832-35) had accustomed the people to abundant food; and when bad weather, beginning in 1836 and lasting for several seasons, reduced the crop and raised the price of wheat enormously, ominous symptoms appeared, after they had been leavening the masses of the working-classes secretly for years.

So early as 1836, the working-classes began quietly to band themselves together under the name of *Chartists*. Discontented with the results of the Reform Bill, soured by want of sympathy on the part of their employers, and filled with that vague desire for change which makes the working-man generally a Radical in politics, they gave in their names in hundreds to agitators, who proposed to send a monster petition to Parliament, demanding five changes:—

1. Universal Suffrage.
2. Vote by Ballot.
3. Annual Parliaments.
4. Payment of Members.
5. Abolition of Property Qualifications.

This association grew to a head in 1838, when the Government resolved to put down the torch-light meetings

that were held in Lancashire and elsewhere. The most prominent Chartists at that time were a preacher named Stephens, Richard Oastler of Leeds, and Feargus O'Connor. Mr. Fielden, M.P. for Oldham, was foolish enough to lend them his countenance too.

The Chartist movement took gigantic proportions in 1840. A National Convention was formed ; and a petition, signed by more than a million, and in diameter like a coach-wheel, was rolled into the House of Commons. To this, however, the House resolved by a majority to give no consideration. Then occurred at Newport in Monmouthshire proceedings, which called forth from Mr. Frost, a magistrate there, an avowal of the most violent Chartism ; which he seconded, later in the year, by collecting a band of seven thousand discontented miners to attack the town. Attacking the hotel in which the military were stationed, this mob was repulsed with the loss of twenty lives. It was found that this was the outburst at Newport of a much more widely-spread conspiracy, embracing Birmingham and other centres. Frost, Williams, and Jones, at first condemned to death, were afterwards transported.

These were symptoms, not to be misunderstood, of a deep-seated spirit of disaffection among the operative classes. The first duty of patriotic men was, therefore, an attempt to ascertain the cause and apply the cure.

In September 1838, at a dinner in Manchester, about sixty men of public spirit united themselves into a society for the advancement of free-trade principles. This was the germ of the *Anti-Corn-Law League*.

The members of this association went to work vigorously, analyzing the House of Commons, and ascertaining the feelings of each individual member upon this subject. Foremost among the delegates, who undertook the task of instructing the nation in its duty upon the subject of cheap corn, was Richard Cobden, a Manchester calico-printer.

The opposite party, resolved to fight to the end for the existing state of things, combined as Protectionists to resist the encroachments of the unrelenting League. The crisis could not be long delayed, for distress had darkened so much in the manufacturing districts, that death and ruin

stared many in the face. Workmen were idle ; rents were not paid ; bread robberies became frequent ; and the smaller shopkeepers could get no sale for anything but remnants of cloth for patches, and scraps of food. The mill-owner and his workmen felt the pangs of distress together ; for business seemed to have suffered a complete paralysis.

It was but natural that riot should crop up out of this condition of affairs ; but it was a temporary effervescence, and, on the whole, the misery was borne with singular patience. One set of riots took a grotesque shape. Though unconnected with the corn agitation, the proceedings of Rebecca and her children in Wales showed that the peasantry were disposed to brave law in the attempt to redress grievance. Annoyed by the erection of toll-bars, which, by heavy exactions, diminished, or altogether swallowed up the profits at market, the Welsh people commenced a series of midnight raids upon the turnpikes, which they, dressed in women's clothes, tore down in scores. These daring acts were performed by men who were maddened by poverty and hardships.

That there were some feeling hearts at work for the poor operatives, whose very lives were ground out with labour, may be seen in two Bills brought forward in the House in 1842. The one was a Bill by Lord Ashley, forbidding boys under ten, and women of any age, to be employed in mines and coal-pits. Terrible revelations of stunted misery, of hideous deformity that never saw the sunlight, were made by a commission of inquiry on this subject ; and the Act was the result. The other was a Factory Bill, advocating shorter hours of labour and the opportunity of education for the children employed.

Meanwhile the Anti-Corn-Law League had been pushing members devoted to the advocacy of their principles into the House of Commons ; and Richard Cobden had spoken fearlessly out, disregarding interruption and sneers. Then the battle between Protection and Repeal went rapidly on.

The triumph of the latter came, when the excessive rains of 1845 blighted the potato-crop of Ireland, and destroyed this food, which was the staff of life to the peasant in that land. It was seen that, while Famine was beginning to stalk with



haggard eyes through a once fertile land, the country must not be left to depend upon chance supplies of foreign grain. The Cabinet resolved that the Corn Laws should be, if possible, repealed; and the Queen's Speech, in January 1846, more than hinted "that there might be a remission of the existing duties" on many articles besides those already relieved.

On the 27th of January 1846 the Ministerial scheme was unfolded. Its principal terms were: that all agricultural produce used for cattle should come in duty free; that grain from the colonies was to pay a duty merely nominal; and that for all other grain, protection was to cease after three years, the duty in the meantime being considerably reduced. The duty sunk at once from 165 to 45—a very considerable reduction. In order to give relief to farmers, it was arranged that those intending to make agricultural improvements might obtain loans from Government; and that country parishes were no longer to be burdened with the support of labourers, when there was scant work in the mill districts.

The debate lasted, on the second reading, for twelve nights—between the 9th and the 27th of February; and resulted in a victory for ministers, with a majority of 91. This was but the first of a succession of triumphs, which ended in the Bill becoming law on the 26th of June.

The Protection party struggled as long as they could. They saw no prospect of famine in Ireland, and knew no valid reason for the Repeal of the Corn Laws. Sir Robert Peel, whose opinions on the subject had gradually undergone a complete change, expressed his sorrow at the loss from his side of many who had given him generous support, but, at the same time, he claimed the right to think for himself, and did not feel shame or loss of dignity in making a public avowal of the change his opinions had undergone.

When the great battle was over, the chiefs of the triumphant side congratulated each other on the splendid result of their tactics. Peel declared, that "to one man was the great work of repeal mainly due, and that Richard Cobden was that man;" and Cobden stated in public, "that if Peel had lost office, he had gained a country."

## CHAPTER VI.

## THE ELECTRIC TELEGRAPH.

FOREMOST among the inventions of this period—if not among those of the century itself—stands the ELECTRIC TELEGRAPH. Like many other of the greatest boons which the researches and the genius of scientific men have given to the world, it did not burst upon the mind of any single *savant*, like a lightning flash of inspiration ; but grew gradually into being, as successive advances were made in the study of Electricity and Magnetism.

So long ago as 1753, there appeared in the *Scots Magazine* a paper, signed C. M., detailing the invention of a machine which, by sending a current of electric fluid along wires, rang bells at the opposite end by causing the electric spark to strike against them. In 1774 Le Sage of Geneva invented a similar set of wires, which caused balls of pith to repel each other.

Then came the inventions of **Galvani** and **Volta**. The former, a professor at Bologna, was engaged in some electrical experiments at a table, on which lay the legs of *frogs* prepared to make broth for his wife. When sparks were taken from the conductor of the machine, the dead legs began to twitch. This led the professor into experiments, from which he deduced results important, though in some respects erroneous. **Volta**, a professor at Pavia, detecting the presence of electricity, not in the muscles or nerves of animals, but in such metals as copper and iron, invented the *Voltaic Pile*, by which electricity might be accumulated. It consists of discs of copper, zinc, and damp cloth placed above one another in sufficient number, the upper and lower plates having wires attached. This invention dates from 1800. The more important steps of advancement belong to the present century.

**Electro-Magnet.**—Though the effect of lightning upon the compass-needle had caused scientific thinkers to suspect a close connection between electricity and magnetism, it was not until 1820 that the suspicion became a realized fact. In that year Professor **Oersted** of Copenhagen found that a magnetic-needle was disturbed in its rest, and deflected from its position, when a current of the electric fluid passed near it. This is the cardinal fact, upon which the invention of the Electric Telegraph rests. Schweiger of Halle then invented the *Electro-Magnetic Multiplier*, which causes a comparatively feeble current to increase in deflecting power, by passing through a wire which is coiled many times round a magnetic-needle.

The experiments of **Michael Faraday**, begun in 1831, gained important steps in the progress of Magneto-Electricity.

Steinheil of Munich invented a system of horse-shoe magnets, which, acting along copper wires, caused tubes of ink to impress dots on a paper that was moved by clock-work.

But the great practical inventors, the men whose names will be always most prominently associated with the application of this great power to the use of communicating thought are, **Charles Wheatstone** and **William Fothergill Cooke**.

Cooke, an invalid Indian officer, residing at Heidelberg, amused himself with scientific studies, in the pursuit of which he constructed a telegraph with six wires, forming three complete metallic currents, which, by the deflection of three needles, produced twenty-six distinct signals. Here then was an alphabet to work with. Cooke invented also the detector, and the alarum.

Wheatstone, once a maker of musical instruments, was Professor of Experimental Philosophy in King's College, London, at this time, and had been engaged for years in electrical experiments, with a view to make the **1837** mysterious fluid the bearer of thought. In February **A.D.** 1837 he and Cooke met—and a fortunate meeting it was; for Wheatstone had science, and Cooke had the practical skill that turns science to account.

The result of their joint-designs was an Electric Telegraph, of which the following is a description :—

**The Electric Telegraph.**—On a diamond-shaped dial-plate were five light magnetic needles, each with its coils of insulated copper wire surrounding it. To these the electric currents were conducted by wires, which were connected with the poles of a Voltaic Battery, worked by pressure upon metal buttons. An electro-magnet gave an alarm, by releasing mechanism which struck upon a bell.

A trial was made one evening in July, between Euston Square and Camden Town, and the success was complete ; but the invention was too complicated and costly for general use. We can easily conceive the agitation of the inventors, as they sat at different ends of the wires, watching the result of the trial ; and can join in the thrill of congratulation which flashed along the wires : “ All’s well ; thank God ! ”

The commonest form of the Telegraph is a single deflecting needle, hung vertically, and spelling out its messages by movements to the right and left. Two needles are often used. The principal parts are, the transmitter, the wires, the receiver, and the alarm.

The *Sand Battery* is most used in the transmitter. It is formed by plates of copper and amalgamated zinc, the spaces between being filled with sand moistened with sulphuric acid and water. The amalgamation of the zinc, which is accomplished by dipping the plates in diluted muriatic acid, and then in quicksilver, greatly increases its electro-motive force.

The *Wires* are of iron—rarely of copper—painted with tar or linseed oil, to prevent rusting. They are stretched on posts of fir or larch, about 30 feet high and 5 inches in diameter ; every tenth post being stronger than the rest, for the convenience of stretching the wires. To preserve the posts, they are charred at the end which is driven into the earth, and are impregnated with a solution of sulphate of copper, which has been forced through from end to end, so as to expel the sap. In countries abounding in forests, such as Switzerland, Germany, and America, living trees are used for this purpose ; and ere long it is likely that iron posts will be generally adopted.

The *Insulator*, of which the object is to prevent the current from passing out of the wire, was in Cooke's telegraph an egg-shaped piece of earthenware, with the wire passing through it. At present the form is frequently that of a porcelain-bell. When living trees form the posts, a swinging insulator is used, lest the motion of the wind should affect the wires.

A necessary part of the electric-telegraph apparatus is the *Earth-connection*. This is generally a plate of sheet copper, some eight feet square, buried so deep as to be always damp, and joined to the electric apparatus by insulated copper wires. In the neighbourhood of railway stations, the wires are soldered to the gas-pipes, or, better still, to the water-pipes, that branch under ground.

Having now given the reader an idea of the steps of progress, which led to the completion of the Needle Telegraph, and having described the principal apparatus, it remains for me to give a brief account of the chief varieties of the Telegraph, which inventive genius has devised since the great triumph of 1837.

The **Printing Telegraph** of House, patented at New York in 1845, is complicated in its structure. By means of a key-board like that of a piano, divided into twenty-eight notes, a contact-wheel, which sends currents along the wires, is stopped at points, indicating certain letters. Thus, at the other end, a steel-type wheel, engraved with the letters of the alphabet and revolving by means of an electro-magnet, is arrested and made to print a certain letter on a strip of paper.

An Austrian engineer, named John, devised in 1854 an improvement upon the printing apparatus. In his receiver the marks are made upon the paper by a small circular disc of metal, which is kept revolving edgewise in a dish of ink, or other coloured fluid.

But more curious than even the Printing Telegraphs are the **Electro-Chemical Telegraphs**.

So early as 1846 Mr. Alexander Bain patented an instrument of this kind. It differs from other telegraphs already existing only in the method of receiving messages. A piece of paper, rendered sensitive by being steeped in prussiate of potash, nitric acid, and ammonia, dissolved in water, is made

to revolve under a style or pencil, which travels in a spiral curve over its surface. So long as no electric current is passing, the point rubs over the surface without producing any mark ; but, when the circuit is closed and a current flows, the electricity decomposes the salt solution, with which the paper is impregnated, and the pencil leaves a blue line of dots, the shape or place of which denotes a certain letter.

This has been improved so as to produce fac-similes, and even portraits : and by a most ingenious contrivance, a message can be sent at the rate of 282 words in 52 seconds.

Another instrument, by Bonelli, prints fac-similes ; and, if the message be in fugitive printing, on paper prepared with iodide of potassium, the colour of which fades, it can be sent at the remarkable rate of 1200 words a minute.

It is impossible to over-rate the greatness and the wonder of this invention. When the Armada hove in sight off the southern shore of England, the glare of beacon-fires, kindled on every height and headland, from St. Michael's Mount to Skiddaw, told the startling news to England that there was a cloud of peril brooding on the southward seas. In later times various inventions, displaying more or less ingenuity of contrivance, were made, by which flags and sign-posts sent tidings from height to height. But to chain the very lightning, making the most terrific and, in some forms, the most destructive agent of our world do our bidding at the touching of two wires ; to destroy almost entirely the obstacles of time and space, and to communicate thought with a speed almost rivalling the speed of thought itself ; to do this irrespective of atmospheric change, and to send the silent yet eloquent wires along the very bed of the Ocean, the wonder of those strange creatures who haunt the caverns of the deep ; —these marvels are the creation of the Nineteenth Century ; and no century since the birth of Time has witnessed achievements so nearly approaching the feats of that Magic Art, to which the days of yore furnished many pretenders.


## CHAPTER VII.

## PROGRESS OF EXPLORATION.

As a natural result of the vast improvement in the means of travelling, the progress of Geographical Exploration has been constant and rapid during the Nineteenth Century. Its principal fields have been Africa—so long a sealed continent—the Arctic Regions of North America, and the great continental island of Australia. The establishment of the Overland Route to India, though scarcely a work of exploration, is a note-worthy circumstance in the history of travel, falling naturally into the scope of the present chapter.

**Africa.**—Previous to the first journey of Mungo Park—who ascended the Gambia in 1795, and commenced his researches from Pisanía—little was known of Africa beyond the results of certain explorations along the coast, which were mere skirmishings along the outworks of this great camp of savagery and idolatry. Egypt, to be sure, had been known from the earliest times, and traffic had found its way to the Upper Nile, while Arabs had traversed the States of Barbary. But south of Atlas, and west of Lupata, there lay unknown burning lands, the cradle of mighty rivers yet to be explored.

Park traversed several petty kingdoms—in one of which he was robbed—before he entered the Moorish State of Ludamar, where he was made prisoner by King Ali, whose queen Fatima, a lady of enormous corpulence, expressed a desire to see the monster called “a white man.” But he escaped at last, and found the arid desert more friendly than the huts of his recent keepers. At length he reached Sego, the capital of Bambarra, and there saw, with an exultation no pen can describe, the great river Niger, or Joliba, flowing eastward—in opposition to the usual course given to it upon conjectural maps of Inner Africa. Having made some



further explorations on the river to Silla and elsewhere, he turned his steps eastward to Pisania, which he reached in 1797.

It is related that Sir Walter Scott, rambling one day by the Yarrow, found Mungo Park, who practised as a surgeon in Peebles, dropping pebbles into a deep pool of the river ; and on being questioned by the poet, the traveller replied that such was the manner of ascertaining depths adopted by the natives of Africa. The idea of a second journey was floating in his mind. His plan, when matured, was to travel with a party to Sego, where he proposed to build two boats, and sail in these to the estuary of the river. He set out in 1805, with a force of forty-five men. Near Satadoo the terrible rains of Africa, which turned the country into a fever-bed, overtook them ; and, in addition, they suffered much from the thefts of the natives. When Park reached the ridge dividing the Senegal from the Niger, he found only *seven* sick men remaining of all his stalwart retinue. Yet he did not despair. Embarking on the great river, the party floated down the current in the November of 1805 ; received as friends in some places, but in others subjected to attacks, which they repelled by a sharp fire. The crisis occurred at Boussa, where rocks overhang the narrow stream. Met there by a formidable native force, and seeing that there was no hope left after a long defence, Park sprang into the river and perished.

In 1822 Major Denham and Lieutenant Clapperton, armed with means of exploration from the British Government, passed from Tripoli to Mourzouk with the intention of penetrating Central Africa. The Great Desert did not daunt them with its arid leagues of salt and its vast hills of billowed sand. A fortnight of such travelling prepared them for the delight of beholding vines begin to creep over the sides of the ravines, and flowers to brighten in the vales. At Lari, in Bornou, they saw from a hill the great Lake Chad, the centre of all their discoveries. After residing for some time at Kouka, exploring Bornou, Denham made an excursion to Mandara, while Clapperton visited Kano, the capital of Houssa, and the commercial centre of Southern Africa. The enterprising travellers, having recrossed the Desert, returned to Europe in 1825.



At the end of the same year Clapperton gallantly undertook another expedition into Africa, which he entered at a different point—the Gulf of Benin. His course ran from Badagry, through the kingdom of Yarriba, to the Niger. The death of his companions left him with no associate but a faithful servant, named Richard Lander, of whom we shall hear again. Some of Clapperton's troubles arose from the violent passion which an African widow queen entertained for him. He struck the Niger near Boussa, where Park perished. Among certain peculiar religious rites found in vogue in this part of Africa, Clapperton saw natives writing a verse of the Koran on a board with charcoal, washing off the writing, and drinking the dirty water, under the impression that they were thus fulfilling a pious duty. At Sackatoo the traveller was seized with dysentery, which proved fatal. Lander, who formed the design of exploring the Niger to its end, was for a time compelled to abandon his efforts, and returned to England in 1828.

Major Laing, in 1823, penetrated to Timbuctoo; and a Frenchman named Caillié travelled from Sierra Leone to Morocco, visiting Jenne and Timbuctoo. But the brothers Lander added to our knowledge of Western Africa the greatest fact achieved since Park had discovered at Sego the direction of the Niger's course. Richard and John Lander, sailing from Portsmouth in 1830, landed at Badagry, where the natives, little accustomed to clothing of any kind, laughed immoderately at their huge straw-hats and Turkish trousers. They followed Clapperton's course to Eyeo and Boussa, where they vainly tried to recover the books and papers of Park. Dropping down the river in boats, they made tolerable progress, until they reached Kirree, where a number of fierce negro slaves, in the European dress, and armed with guns, made them captive, and carried them to Eboe, the chief mart for slaves and palm-oil. Richard Lander, being there released, set out to complete his discovery, leaving his brother as a hostage for the payment of the ransom agreed on. When he had sailed down the Brass River—a branch of the Niger delta—he saw the Atlantic surf foaming on the bar of sand that stretches across the mouth of the channel. What a feeling of triumph must have

swelled his breast, as he felt himself the solver of the great geographical problem, which had taxed the enterprise of so many ! (1830 A.D.)

In the next period the discoveries of Livingstone on the Zambesi, of Speke and Baker on the Nile, will be narrated.

**The North-West Passage.**—From the days of the Tudors, when Cabot, Frobisher, and Davis strove to unlock the secrets of the ice-bound channels, the North-West Passage from Europe to the Pacific has been a problem, to the investigation of which gallant men have vainly lent themselves. Hudson and Baffin—as their names lingering still among the icebergs show—devoted themselves to this task in the beginning of the seventeenth century. But the triumphant solution of the problem,—Can a ship sail, from the Atlantic to the Pacific, by the northern coast of America ?—was reserved for the present time.

In 1818 the Admiralty began to bestir themselves on this subject. Ross and Parry were associated in the first voyage of exploration ; but Parry afterwards took the lead in Arctic discovery. He explored Lancaster Sound and Prince Regent's Inlet, was wrecked, and frozen up more than once, to endure the rigours of an Arctic winter. In 1829 Ross, having reached a spot where the needle dipped until it stood nearly vertical, discovered the Magnetic Pole ; Rae ascertained in 1847 that Boothia is a peninsula ; and in 1845 Sir John Franklin started with the *Erebus* and the *Terror* on that tragic voyage, the mystery of which was not solved for twelve years, when the explorers of the *Fox* found some relics of the dead at the mouth of the Great Fish River. This intrepid but hapless sailor had solved the difficulty of the North-West Passage ; but this triumph was also achieved by Captain Robert Maclure in 1851.

This officer, already skilled in braving the dangers of the ice, sailed in 1850 in the now famous *Investigator*. Entering Behring's Straits, he passed Capes Bathurst and Barrow, and discovered two islands, which he named Baring and Prince Albert. Threading the strait between, he pushed his ship within twenty-five miles of Barrow's Strait, which led directly to the Atlantic Ocean. But just as victory seemed certain, the ruthless ice closed round his ship, and

left him helpless, after having traversed nearly one thousand miles of sea never sailed on before. Resolved, however, to satisfy himself as to the existence of a passage to Barrow's Strait, Maclure travelled in a sledge to the shore of that water, where he erected a cairn (October 26, 1850). On his return, having left his men, he lost his way, and with difficulty reached the ship, after spending a night in the snow. After six months of winter life, the sledge journeys were resumed. Baring's Island yielded traces of a vast forest, long since frozen to death. On Prince Albert's Island he found a race of olive Eskimo, who had never seen a white face before, but whom he was glad to greet as the only strange human beings the crew of the *Investigator* had met for three years. During the summer of 1851 the ship was freed from the ice—only, however, by the blasting of gunpowder; and even this liberty lasted but for a brief period. Another winter of intense frost and another summer of hopeless captivity passed, at the end of which their meat was reduced to half a pound a-day for each sailor. At length Maclure resolved to attempt an escape in sledges from Mercy Bay, as he had devoutly named the place of his detention. He faced this plan much as a beleaguered general resolves to cut his way through the enemy's lines. While their powder and shot held good—and they had not failed yet—a supply of venison was obtainable; but, when this resource failed, there was no prospect but starvation. Just at the critical moment, when the plan of escape had been fixed and the day named, a sledging party, under Lieutenant Pim of the *Resolute*, who had found traces of the prisoners on Melville Island, arrived at Mercy Bay, to the intense joy of the ice-bound crew. Maclure, who had ultimately resolved to remain with his ship rather than proceed with the sledging party organized for escape, had already written a despatch containing these words:—"If no tidings of me are heard next year at Port Leopold, it may be concluded that some fatal catastrophe has happened—either that we have been carried into the Polar Sea, or grounded in Barrow's Straits. In that case let no ship proceed to our relief, for we must all have perished from starvation; let no lives be risked in quest of those who will then be no more." Cling-

ing to the last to his ship, Maclure succeeded in releasing her from the ice, and carrying her safely to the Atlantic waters.

So, almost simultaneously, but quite independently of each other, Franklin and Maclure made the grand discovery that the two Americas form one island, separated by sea from the icy archipelago of the North Pole ; and none has been keener to admit the priority of Franklin's achievement than the gallant Maclure. But the commercial value of this discovery is nothing. Impossible as it is for ships regularly to coast Siberia following the North-East route, it is still more difficult to turn to practical account this North-West way, the exploration of which has cost so much toil and life. It nevertheless remains a grand addition to our geographical knowledge.

**Australia.**—In 1814, when Captain Flinders published his survey of the coasts of this vast island, the name Australia began to supersede the older title of New Holland, which suggested early domination by the Dutch. The first part to rise into prominence was the colony of New South Wales ; and most of the explorations were at first conducted from Sydney as a centre. The discovery of the river Murray ranks among the chief exploits of Australian enterprise.

The interior of Australia was long an unknown land. Geographers guessed that it contained no high central mountains, owing to the absence of any great streams flowing from the centre, and to the prevalence of hot and dusty winds from that region. All that was known of it seemed to shadow out a vast depressed basin, intersected by streams or *creeks*, which in the dry season became chains of unconnected water-holes. The Blue Mountains, rising in an abrupt wall of about 3000 feet in height, formed the first formidable obstacle to daunt explorers. When these were passed, a land rich in verdant grass lay before the astonished and delighted gaze of the first adventurers who climbed the barrier.

On November 9, 1828, an exploring party, led by Captain Sturt of the 39th Regiment, started from Paramatta. His comrades trusted in the tall, gaunt soldier, son of a Dorset-

shire squire, who directed their course. Coming to the Macquarie, a river flowing towards the west, they took to a boat, and floated on until the current grew slower, and the boat at last went aground amid a wall of reeds. Sturt, leaving the skiff, walked fairly round the end of the river. Here was a difficulty. Rivers flow for the most part into some sea, stream, or lake ; but here was a current, arrested midway and actually disappearing. The mystery was afterwards solved by the discovery that the water, which, in dry seasons, was absorbed by the sandy soil and by evaporation, passed westward in the times of rain by fifty rills—but whither ? Struggling westward and northward down a dry and stony creek, Sturt suddenly came to the edge of a cliff, 50 feet high, and saw below, flowing westward, a mighty river white with flocks of pelicans. This was the *Darling*. The mixture of brine springs, higher on its course, makes it salt (January 18, 1829).

In November 1829 Sturt's second expedition set out from Sydney, bent upon exploring the course of another stream called the *Morumbidgee*. A whale-boat in pieces, packed on drays, and a still, lest the water might prove salt, were among the equipments of the explorers. Sailing down the Morumbidgee, on whose banks of sandy soil the black quail piped among fields dotted with cypress trees, Sturt met the same strange fortune that had befallen him before. The boat grounded. The river lost itself in reeds. The captain, however, resolved to persevere. Building a better boat in seven days, and sending the drays back, he launched again on the stream beyond the reeds, found the current to grow deep and strong as he glided swiftly down, escaped the peril of floating and sunken logs that beset the stream, and in eight days shot triumphant into the clear green flood of the *Murray*. On the banks the natives, daubed with war-paint, and jabbering war-songs, shook waddy and boomerang as they passed, and on one occasion attacked the boat ; but Sturt managed to escape this danger. Beyond the junction of the Darling, which mingles its flood with the Murray under the shadow of huge sandstone cliffs, the stream sweeps in vast volume to the sea, and after the great bend, occurring at 34° south latitude, follows a course due

south. Great and majestic as this river is in its middle course, with that strange contrariety which seems to characterize the streams of Australia, it reaches the sea in an ignoble fashion, spreading out first into the shallow Lake Alexandrina, and then threading its way in a narrow channel among a series of sand-hills, which quite intercept a view of the river from the open sea. No ship, engaged in tracing the coast, could have suspected that the mightiest river in the island-continent was represented by the puny-looking current, that flowed into the sea from behind the sandy elevations. Owing to the bar, there is no great city on the Murray.

These discoveries were confined to the south-east corner of the island, while the centre still remained a mystery. Nor was it until 1847 that the same intrepid explorer, Sturt, made a journey, which, though not striking the exact centre, lifted the veil from a large portion of the interior. And what did it reveal? A burning land, where the birds flew gasping overhead and the bullocks could not bear their iron yokes for the heat of the metal—a gloomy desert of sand and wiry grass, crusted here and there with white patches of sparkling salt—swelling sometimes into billows of naked red stone, glowing like fire. Cooper's Creek was hailed as a pleasant oasis in the waste.

Australia has had her martyrs of discovery as well as fatal Africa, whose burning breath and heart of flame have, with a fascination strange yet irresistible, drawn many an ardent explorer to his doom. Leichhardt, the botanist, starting from the Darling with the hope of reaching the Swan River, found a nameless grave somewhere in the arid wilds. Kennedy fell under the spears of the natives. And two brave Britons, whose story belongs to the succeeding period, have also written their names with their own life-blood upon the pages of young Australian history.

The sudden and surprising revelation of rich gold-fields in various parts of the World has been among the most notable and influential features of the Nineteenth Century. The discoveries began in remote and frozen Siberia, where the precious metal was found at Tomsk and Yeneseisk; in 1842 the Ural Mountains showed signs of the yellow ore;

and, as a result of both, the Russian revenue rose to treble its former amount. In 1847 a Californian saw-miller picked some glittering pebbles from a brook beside the Sacramento, and, when the news spread that they contained gold, there was a torrent of emigration, in streams converging from every civilized land towards this modern *El Dorado*. Colonization has seldom received so mighty a stimulant as that supplied by the revelation of these gold-fields. The old vision of Pactolus, which glitters like a thread of gold in the pages of classic literature, faded to insignificance before the golden lustre of the Sacramento. With little equipment beyond a red shirt and a pickaxe, thousands trooped off to the "diggings," scorched by that "*auri sacra fames*," which exercises on man so irresistible a power. The plough stood still; the hammer rested on the anvil; the shop had neither keeper nor customers; the merchant forgot his ships, the lawyer his papers, the soldier his sword; and there was danger in many places that the necessary labours of society would fail for want of hands. But this worked its own cure. Those unused to the hard toil and reckless life of the miners either died off or came home, sadder and wiser, and the gold-digging fell to be a regular business, in which companies embarked and machinery came into use. As an instance of the powerful impulse given to emigration by these discoveries, we may note the fact that San Francisco, in 1845 a village of two hundred souls, had become, twelve years later, a city with 40,000 inhabitants.

Scarcely had the bloom of novelty disappeared from the announcement of the discovery of gold in California, when the world was electrified with a similar announcement, possessing a special interest for Britons—*Gold was discovered in Australia*. For years there had been scattered instances, whose mystery excited a passing curiosity, of colonists and convicts being in possession of rough lumps of gold, for which they refused to account. At length a farmer at Bathurst, named Hargreaves, who had been in California, and had pondered much on the similarity of the geological features of that country and his own—a similarity also pointed out by Sir Roderick Murchison—explored the country near his house, and was rewarded with the discovery

of nuggets—April 1851. Then came a rush stronger than even that to California. The excitement increased when Ballarat, near Melbourne, disclosed its golden treasures, and other auriferous deposits were found. The influence at first was injurious, as in California, by the withdrawal of labour from the established trades; but, on the whole, the island has benefited enormously by the influx of a vast additional population. Melbourne is the most extraordinary instance of city-growth in the history of the world. Where, in 1835, a few squatters camped under the spreading gum-trees, a city, which has passed through all gradations of canvas, wood, and masonry, now exists, with a population of 150,000. The largest nugget yet found was dug at Ballarat; its weight was over 2000 oz.—its value £8000. Three processes complete the working of the ore after it has been dug. Crushed between iron cylinders, which revolve in opposite directions, it is sifted and washed in troughs called cradles, and then the particles are collected by forming an amalgam with mercury.

Gold has been discovered also in British Columbia, in Nova Scotia, and at Otago in New Zealand. Vast quantities of the precious metal have consequently been poured into Europe, with the result of causing a considerable rise in the price of nearly everything.

**Overland Route to India.**—In the Middle Ages a very few men toiled painfully overland from Europe to India, taking a score of months, and undergoing innumerable dangers in the performance of the journey, which was practically valueless except as an exhibition of persevering enterprise. After the voyage of Vasco de Gama, the great sea-road was open, and this continued to be the only route to India until midway in the present century.

To a naval officer named Thomas Waghorn we are indebted for the establishment of what is known as the Overland Route. His earliest idea, conceived amid the hardships of the Aracan War, in which an exhausting fever reduced his strength seriously, was the formation of a company for steam-navigation between Great Britain and India. This idea was first published by him in 1827; but when he found it coldly received by the public, his thoughts



turned to the establishment of a new route to India, passing along the Mediterranean, across the Isthmus of Suez, and down the Red Sea. Receiving a commission from the Directors of the East India Company in 1829 to survey the Red Sea, with a view to its navigation, and being intrusted with despatches to Sir John Malcolm, Governor of Bombay, he set out upon his experimental journey.

After four days of preparation, he left London (October 28, 1829) on the top of a stage-coach. Everything seemed to be against him. Accident beset the coach, steamer, diligence, in which he travelled, or wished to travel; nevertheless he reached Trieste in *nine* days, having accomplished the distance in almost half the time usually taken by the express couriers of the mail. After a hopeless chase along the coast in pursuit of an Austrian brig that had just sailed for Alexandria, he returned to Trieste to wait for a Spanish ship, whose captain he induced, by a bribe of fifty dollars, to sail in two days. It took sixteen days to reach Alexandria. Having rested there for five hours, he trotted off upon a donkey, bound for Rosetta; but the cunning Egyptian asses belie the proverbial ascription of stupidity to their kind, for, finding that this restless white man suffered no slackening of the trotting pace, they began to fall down, or otherwise counterfeit weakness and fatigue. At Rosetta he embarked in a Nile sailing-boat of fifteen tons, which covenanted to leave him at Cairo in less than four days; but it ran aground, and tacked so aimlessly about that he left the vessel, preferring even the delusive donkey to such mockery of progress. From Cairo to Suez stretched a desert tract, across which he sped in four days, exciting among the camels to the full as much surprise as he had roused among the knowing donkeys of Alexandria. Here then he was at Suez on the 8th December, as he had agreed to be; but of the steamer *Enterprise*, to meet which he had been straining every nerve for six weeks, there appeared no trace. He refused to wait. Bent upon carrying his despatches forward, and at the same time making soundings of the Red Sea, which was supposed to be innavigable, he embarked in an open boat, with no chart, no compass, no knowledge of the coral reefs that jag the sea. His six Arabs soon mutinied against

the mad white man, but his daring courage overawed them ; and through perils of sky and sea and angry men, he pushed on until in six days and a half he reached Jedda. There the news met him that the *Enterprise*, owing to her defective condition, was not coming for him at all. The vexation, acting on a frame overstrained with fatigue and excitement, threw him into a brain-fever, under which he lay for six weeks on board the *Benares*. This danger passed, he set out for Bombay, which he reached on the 21st of March 1830, having performed the journey, deducting the time of his illness, in little over two months.

After these material difficulties had been overcome, it might be supposed that there was little to do but lay his scheme of travel before those concerned in its success, and receive his thanks and his reward. But such is not usually the fate of reformers, inventors, or those who seek to move men from a long-trodden pathway. He had still to face the cold reception, which chilled his ardour; the official jealousies, that cast obstacles in his way; and the secret slanders, which magnified his enthusiasm into insanity. It was actually said in Egypt, by agents of the East India Company, that he was a madman, in the hope of prejudicing the Pacha against his scheme. But he never ceased to toil. By 1841 he had planted hotels amid the desert sands, and placed steamers on the Nile, and had turned wild Arabs into civilized and civil guides. The importance of his plan recognized—and some money rewards, not of enormous value, voted by the Government and the Company, he saw the triumph of his life's work ; and then—he died, worn out by the struggle he had undergone.

Since Waghorn's day a railway has been made across the Egyptian swamps and sands ; and names, familiar to the student of ancient history, sound oddly from the lips of guard and porter as the train slackens its pace at the various stations. The French are engaged at present, with the sanction of the Egyptian Government, in cutting a ship-canal through the Isthmus of Suez ; but it is doubtful how far this can ever be a complete success, owing to the sand. India can now be reached from England in about a month, at a cost of £100.

## CHAPTER VIII.

## THE GREAT EXHIBITION OF 1851.

IN 1849 several meetings of the Society of Arts were held at Buckingham Palace, Osborne, and elsewhere, under the Presidency of Prince Albert. The principal object of these was to organize arrangements for carrying into practical effect an idea, which common rumour assigned to the suggestion of the Prince—viz., that a great Exhibition of the Industry of all Nations should be held in London, the centre of the commercial world.

The work, thus set on foot, advanced rapidly to completion. Competent persons visited the chief industrial districts of the country, in order to ascertain the feeling of the manufacturers on the subject; and from all parts of the country most cordial responses were received.

In 1850 a Royal Commission was appointed to carry out this great scheme. One of the first questions requiring attention regarded the collection of necessary funds, which the Commissioners guaranteed to the extent of £230,000. But it was resolved that every effort should be made to secure an important feature in the proposed Exhibition,—that it should be self-supporting. Many onerous duties then devolved upon the managers of the plan; and not the least among these concerned the allotment of the necessary space both to intending exhibitors at home and to the representatives of foreign countries. Their deliberations also embraced the discussion of various plans for the organization of the Exhibition, and the decision among very numerous designs for the building, sent in not only from Britain, but from the chief cities of the Continent.

The plan resolved itself into four great departments—(1.) Raw materials and produce; (2.) Machinery; (3.) Manufactures; (4.) Fine Arts.

The Prince-Consort selected as a suitable site a grassy space in Hyde Park between Rotten Row and the Queen's Drive. It mattered not that some fine elm trees adorned the turf; for the plan was so gigantic as to embrace these trees, and use them for the ornamentation of the Palace. Among the many designs for the Exhibition Building submitted to the Commissioners, one presented such features of novelty and beauty that it commended itself finally to their choice. The architect was Mr. Joseph Paxton, who had been recently engaged in planning a range of glass-houses for the magnificent gardens of Chatsworth. Of two materials, iron and glass, the strongest and the frailest we know, he proposed to rear a Palace, which should be worthy to enshrine the collected treasures of the World's industry—a suggestion which seemed at first sight worthier to find place in an Arabian romance than in the sober scheme of a grand national undertaking.

When the building, designed by Mr. Paxton, rose complete in its glittering beauty, it presented the finest combination of strength and lightness, and well deserved the name ascribed to it by common consent—the Crystal Palace. It was constructed in squares of twenty-four feet, with a cylindrical iron pillar at each corner. During the building every section of the galleries was tested in many ways; the workmen, gathered in a crowd, jumped and danced upon the platform; soldiers marched heavily over it, and rolled round shot along; but it stood every trial. The iron-work came chiefly from Birmingham and Dudley. The vertical supports, made of cast iron, weighed about 3500 tons; while the wrought iron of the connecting arches and girders amounted to 550 tons. Of glass there were 896,000 feet used; and of wood for flooring, 600,000 feet. The outward aspect of the Palace presented three tiers of colonnaded arch-work, above which a lofty transept curved its sparkling head.

By no means a slight labour lay in the preparation of a Catalogue, describing the works of industry and art gathered from every land. For this work the Prince himself selected the appropriate mottoes. His enthusiasm, indeed, in the scheme never slackened from the earliest meeting at which

the idea had been first promulgated. So keen was his desire to see the project fairly afloat, that when, on the 3rd of September 1849, it was announced to him that a contracting firm had been secured—the Messrs. Munday, who nobly risked £100,000 to achieve a patriotic result—he kept gillies, hounds, and the whole equipment of a deer-stalking expedition waiting, until the time for sport had well-nigh gone.

In spite of various ill-omened prophecies, the Exhibition was ready for the day appointed as the time of its inauguration—Thursday, 1st May, 1851. Workmen were hammering away at packing-cases until the previous afternoon; but then a posse of policemen and grenadiers invaded the building and swept it clear, in order that arrangements might be made for the coming ceremonial. The great day broke with a clear blue sky and a bright sun, whose heat, however, a cool crisp wind tempered pleasantly. From early morning places were taken at every point whence the Royal progress to the Palace could be witnessed to advantage; and the pavements between St. James's and Hyde Park presented the appearance of a sea of heads.

About half-past eleven the notes of "God Save the Queen," pealing from the band of the Horse-Guards, announced the approach of the procession; and amid ringing cheers and the thunder of cannon posted on the bank of the Serpentine, a line of eight carriages, each drawn by two horses, drove briskly on with the Court party. One of these the Queen occupied, having preferred such a vehicle to the heavy glass-coach kept for State purposes.

The moment the royal party entered the Exhibition building, the royal standard floated out from the summit of the transept, high above the fluttering legion of foreign flags which dressed the walls on every side. At nine the holders of season-tickets obtained admission, and were seated, to the number of 30,000, without the slightest confusion. And, as the eye wandered over the scene, under the bright light mellowed by screens of coloured calico, the variety of colour and grouping had a striking charm, to which the flutter and hum of expecting multitudes added a further interest.

In the central area, where the transept and the naves in-

tersected, a beautiful carpet, worked by 150 ladies, covered a raised dais, on which stood a chair of state, draped with crimson velvet and gold. An octagon canopy of blue satin relieved by white overshadowed this royal seat ; but a more striking shade was supplied by the whispering leaves of a lofty elm-tree, among whose boughs some sparrows still chirped. The tapering stems and broad leaves of palms and other tropic plants lent associations of other lands to the scene, to which a fountain of cut-glass, glittering in the sun-rays like a splintered iceberg, and tinkling with the cool splash of water, added a fairy-like beauty. Vistas, gay with waving screens of coloured tapestry and brocade, stretched away from the brilliant centre, like the bannered halls of chivalry, but far larger and far brighter.

The assembled crowd contained the most eminent and noble of the land, with many foreign visitors of distinction. There, with white head and eagle face, the Duke of Wellington surveyed a triumph of peace, which could not have existed but for the stern justice meted to unbridled ambition on the field of Waterloo : but all present missed a face, whose absence seemed like a blot on the brightness of the pageant ; for in the previous July a fall from horseback had cost Sir Robert Peel his life. The dresses of the foreign ambassadors, among whom the fantastic figure of a Chinese mandarin was conspicuous—the civic scarlets of Lord Mayor and Aldermen—the Tudor garb of the Beefeaters and the mediæval tabards of herald and pursuivant, intermingled with the waving plumes and rich dress of the beauties of the English Court, combined to make a scene seldom surpassed for brilliance.

A flourish of trumpets proclaimed the approach of Royalty ; but their brazen throats might well have been dumb in the tempest of cheering that filled the transept and went rolling away down the naves. Attired in pink satin brocaded with gold, and wearing a tiara of diamonds, the Queen assumed her seat upon the chair of state, which stood between two equestrian statues—one of herself, the other of her husband. The Prince in Field-Marshal's uniform, the Prince of Wales in Highland dress, and the Princess Royal in white lace, stood immediately beside the throne. Meanwhile a thousand

voices and the swell of a magnificent organ filled the Palace with the music of "God Save the Queen."

The Archbishop of Canterbury then offered up a prayer, that the Divine blessing might rest upon the purpose of the undertaking, which was the union of all lands in the bonds of peace and concord. Handel's *Hallelujah Chorus* was then sung, after which the Prince-Consort, as one of the Commissioners, read an address to Her Majesty. Of this document the following were some of the chief statements:—(1.) No charge had been made for the admission of goods. (2.) The voluntary contributions amounted to £65,000. (3.) The exhibitors numbered 15,000, of whom one-half were British. (4.) The building, 1851 feet in length (mark the coincidence), and covering eighteen acres, had taken just seven months to erect, the first pillar having been placed on the 26th September 1850. (5.) The prizes were to be medals, and the most eminent men in various departments of science had been selected for the juries of decision.

After a short reply by the Queen there was a procession through the building, during which the various organs were played. Preceded by the architect, the contractor, and others concerned in the erection of the Palace, the Commissioners led the way; and then came the Court, with all due solemnity of gold-sticks, gentlemen-ushers, and grooms-in-waiting. When this part of the ceremonial was complete, the Queen from her chair pronounced the Exhibition to be open; the thunder of cannon proclaimed it to the city; and, the barriers being removed, the public were permitted to traverse the building.

For five months of summer and autumn visitors from every land continued to throng the Crystal Palace, to which on certain days the price of admission was only one shilling. After Britain, France and Austria were the chief exhibitors; but in the department of sculpture Prussia, represented by Kiss's bronze *Amazon*, carried off the palm.

The transept presented the most striking view. Its crystal fountain—gilded gates—white-gleaming statues, relieved by dark masses of tropic foliage—the Koh-i-noor, or Mountain of Light, in its golden cage—the elms in green leaf, with a bird or two flitting among the boughs—and

surging through all, with ceaseless hum and motion, a many-coloured crowd, in which the eye picked out, here and there, some strange foreign dress, formed the contents of a great crystal dome, whose likeness the world had never seen.

Yet there was more than Beauty. Utility and Strength had their places, too, in the vast and comprehensive scheme. There were courts where the clank of heavy engines was heard—where printing-cylinders threw off copies of newspaper or book ; and side by side with a locomotive of most modern construction, the practical man might find, for comparison, a model of James Watt's first rude attempt at a steam-engine.

It is impossible to doubt that this great Exhibition gave a most powerful impulse to commerce and the industrial arts all the world over. The example has been followed in various lands ; and on each occasion distinct proofs of progress—in some departments strikingly great—have been displayed. The International Exhibition, held in London in 1862, and the Paris Exhibition of 1867, have been the leading triumphs of this kind.

In order to preserve the Crystal Palace as a lasting memorial of the first of these great World-Fairs, it was bought by a company and established at Sydenham, near London, to be a winter-garden, museum, and concert-hall.



## CHAPTER IX.

## MISSIONARY ENTERPRISE.


**India.**—Under the superintendence of the community called Baptists, Carey, one of the pioneers of missionary enterprise in India, left Europe in 1793. He underwent many sufferings and troubles during the forty-one years of his ministry in the great Eastern Peninsula. The mind of his wife became unhinged, which deepened the gloom amid which he wrought. Through many privations he patiently made his way, living during his times of travel in a couple of small boats, in one of which he lodged, while the other served him for cooking.

Serampore formed the head-quarters of the mission-work, in the way of which existed difficulties so vast as to seem insurmountable. The chief of these were,—the system of Caste, which rigorously excluded any convert from the privileges of society; the want of principle in the Hindoo character, leading to falsehood and theft; and the variety of languages existing throughout the enormous peninsula.

Carey, whose great strength lay in his knowledge of Oriental tongues, faced the apparently hopeless task, strongly trusting that the Master whom he served would cause obstacles to melt away before a servant who was faithful and persevering. In 1801 he published the New Testament in Bengali—a work in which he obtained assistance from some learned natives.

The Government idea, that the “prejudices of the natives should not be interfered with,” was at first destructive to the progress of Christianity in India. And in 1812 a fire, which destroyed a storehouse containing, in translations, &c., the accumulated work of years, impeded the work seriously.

Before his death Carey joined in another movement, intended to sap the foundations of idolatry—viz., the educa-



tion of young Hindoos, both male and female. At the age of seventy-one Carey expired at Serampore. Though originally a shoemaker, he attained such remarkable skill in Oriental tongues that he translated the Bible, in whole or part, into *thirty-five* different languages. He was the author also of a Sanscrit grammar. Marshman, his colleague, translated the Bible into Chinese.

**Jamaica.**—The Baptists occupied Jamaica also as a mission-field ; the Methodists, too, maintained missionaries in that island. The hostility of the white population considerably hampered the freedom of preaching ; and when the vexed question of Abolition, in favour of which all the missionaries spoke strongly, began to convulse the island, this imported a new element of bitterness into the strife. The colonists destroyed the Baptist chapels, and maltreated their ministers ; in spite of which—so vital is Truth—the mission-work struck its roots deeper in the soil and held bravely on.

**Tahiti.**—The London Missionary Society, formed in 1795, from various denominations, sent out the ship *Duff*—a name of good omen in connection with missionary-work—bearing twenty-nine preachers on board (1796 A.D.). Baffled by fierce winds at Cape Horn, the vessel was obliged to seek the Pacific islands by the Cape of Good Hope.

When the missionaries approached Tahiti, they were received with a warm welcome. Canoes, laden with coconuts, bread-fruit, and pigs, came off ; and the crews returned, rejoicing in beads, hatchets, and such other presents as savages love. The king gave the settlers a piece of land, and lodged them in a house built for Bligh of the *Bounty*, which they enclosed with a railing of bamboo.

At first, all went well apparently. The islanders were much given to the crime of child-murder, and their language was a most difficult one, containing numerous large words, composed entirely, or almost entirely, of vowels. But clouds began to rise. A second party of missionaries were made prisoners by the French ; and the Tahitians, beginning with theft, proceeded to open attack, and became so offensive that many of the missionaries removed to Port-Jackson.

Their chief strength lay in the friendship of Pomare, the king's father, who had raised himself, by the aid of the

*Bounty's* crew, from the position of chief to that of king. He was extremely fond of building houses and canoes, and the cultivation of land.

The chief difficulties came from the people, who encouraged their children to be insubordinate at school, and from the wandering habits of the children themselves, who became independent almost as soon as they could climb a cocoa-palm.

Meanwhile a civil war was brewing. Every ship that came from Europe brought muskets, which the king tried to keep to himself, while the people demanded that they should be distributed. The war at length broke out ; and the king, for a time, had much the worst of the struggle, being at one time obliged to leave the island. Pomare—such was his name—continued, notwithstanding his kindly treatment of the missionaries, to be an infidel, until his first triumph in the civil war led him to destroy his idols and embrace Christianity. So bent was he upon the degradation of the false gods which he and his people had been hitherto content to worship, that he placed a log, which had formed the body of one of his chief images, in his kitchen, for his cooks to hang their baskets on. Idolatry was thus abolished in Tahiti and Eimeo.

Ellis and Williams landed as missionaries on the island in 1817. At first the change of faith seemed merely nominal, and had no effect upon the lives of the natives. But soon a wonderful alteration became visible in Tahiti. The Sabbath was scrupulously observed as a day of rest and worship ; the churches were regularly filled ; and all became eager to purchase a copy of some sacred book in the Tahitian tongue. The price of the Gospel according to Luke was three gallons of cocoa-oil.

From a passive recipient of the good tidings, Pomare, the king, became himself a preacher and missionary. Using a simile that every child who heard him could understand, he compared the idols they had flung away to the fibrous husks of the cocoa-nut ; and exhorted his people to exert themselves that other heathens might share in the blessed knowledge that God had sent to them. "Let us buy money," he cried, "for this good thing." His character,

however, was defaced by the sin of drunkenness—an example which many of his subjects were more ready to follow than they were to adopt his precepts. Before his death, which occurred in 1819, he published a Code of Laws, in which trial by jury formed a prominent feature. The people accepted them with a shout and a forest of lifted hands.

The strong drink was supplied chiefly by American ships ; but an opposition to this evil influence arose, and many casks were destroyed.

In 1834, Queen Pomare issued an edict, that all her subjects should attend church and send their children to school, under the severe penalty of forfeiting their lands. This was not a very wise measure, as it provoked opposition.

The French now began to appear in Tahiti, and forced some Roman Catholic priests into what the Queen pathetically called “her poor little island.” Their hold was confirmed in 1839 by the presence of the *Artemise*, whose captain, La Place, extorted a treaty from the chiefs after he had plied them with brandy and champagne. The Roman Catholic Society for the Propagation of the Faith then fixed a sure foothold in Tahiti. After 1843 the influence of France increased rapidly ; and the Queen was treated with insult. A flag with the figure of a crown flying above her house to indicate her rank was pulled down, the ensign of France being hoisted in its place. As a natural consequence followed the proclamation of Tahiti as a French colony. The resisting natives were quelled with grape-shot. This broke up the mission-stations for a time. But the Tahitians were brave enough to face the French again, and defeated them signally at Huahine. Notwithstanding this success, the French succeeded in establishing a protectorate in the island, the Queen residing there under arrangements made with her conquerors.

The French have sadly hampered the British missionaries in Tahiti ; but the firmness of our Government has secured a certain measure of protection for those engaged in the good work there.

**Other Pacific Islands.**—In Tongatabu, one of the Friendly Islands, and St. Christina, one of the Marquesas group, missionaries were placed by the ship *Duff* ; but war and

the hostility of the natives baffled all efforts to do good. At Erromanga, one of the New Hebrides, occurred the chief tragedy that has stained the history of missions in the Pacific. The Rev. John Williams, an able and faithful preacher and missionary, having sailed in 1839 from the Navigators' Islands, landed with a few friends on this fatal shore. The natives, shy at first, afterwards appeared friendly; and Williams divided some pieces of cloth among them. Suddenly, however, the hoarse blast of a conch was heard, and a crowd of yelling savages rushed on the white men. The rest got safe to the boat; but Williams, rushing into the sea, was pursued by a native, who beat him on the head with a club; his body was then pierced with arrows, and crushed with stones, till the sea-foam grew red.

Among other gifts of civilization, the ship *Camden* brought a printing-press to Navigators' Islands. Securely set up in a house of coral-stone, in order to preserve it from the ravages of the white ant, this machine gave the Bible, the Pilgrim's Progress, and other books to the South Sea Islanders.

**Africa.**—In 1798 the missionaries Edwards and Edmonds made a settlement in Southern Africa. A great difficulty in the way of impressing the people there—Bechuanas, Hottentots, &c.—lay in the want of rain, which obliged the natives to keep moving with their flocks and families in search of food. At first the Christian teaching—especially the doctrine of the Resurrection—was laughed at as a collection of idle tales. But there came soon a time of tears, cries, and fainting, during the preaching of the Word, which left good results behind. The Hottentots were eager to frequent the churches; but too often as a matter of mere form or curiosity. On the whole, however, the white men did them good, if only in advancing their material civilization. The dirty kraal became a decent log-house, and the dress grew more decorous.

A landing was made on **Madagascar** in 1818 by Bevan and Jones, who, however, lost many dear relations from the unhealthiness of Tamatave, the chief seaport. In 1820, the king Radama, who was most anxious for the education of his subjects, invited missionaries to his capital, Tananarivo. Ere many years had passed, the printing-press was at work; and the Bible and a Dictionary of the Malagasy language

were preparing the ground. Unhappily this wise monarch died in 1824, and the Queen, his successor, though to all seeming kindly at first, issued terrible edicts against Christianity in 1835. Prayer to Jesus was prohibited under pain of death ; and the schools were shut. When a few faithful converts dared to pray in secret, all the terrors of persecution were let loose on them and similar offenders. They were burned, flogged, sold into slavery, flung down precipices.

**China** was long a sealed land ; but, under the auspices of the London Missionary Society, Morrison went thither in 1807. Unwisely he adopted the Chinese dress and manners ; this gained his teaching no respect. It was with much difficulty that the language was mastered ; for, independent of its inherent difficulty, there was a strict law forbidding the teaching of the Chinese tongue to foreigners. At length (1814) the New Testament in Chinese appeared ; and the missionaries, prevented by most jealous restrictions from penetrating the country, were forced to sail along the coasts, dropping in a book where they could, in spite of fierce proclamations issued against them. A missionary named Dyer cast Chinese types of great beauty.

The Treaty of 1842, resulting in the cession of the island of Hong-Kong to Britain, with the privilege of trading to and building churches in five Chinese ports, aided greatly in opening China to the influences of Christian civilization. The Missionary and the Merchant together assailed the outworks of this stronghold of heathenism. But the fatal use of opium, which flung a blight upon the native population, was a sad and serious obstacle in their way. Recent wars have opened China further, and the influences of the Cross have gained a steady hold.

**Guiana.**—The London Missionary Society sent preachers also to Guiana, where the Negroes received them gladly. But the question of emancipation, as had happened in Jamaica, came to be mixed up with mission-work ; and the ministers, who favoured Abolition, and were therefore beloved by the black population, incurred the bitter hostility of the planters, and such Governors as favoured the latter. The sad story of John Smith has been already told. After the

cause of Abolition triumphed in 1834, the condition of the Negro was much improved ; but he is so impressible and volatile that it is not easy clearly to estimate the depth of the enthusiasm with which, in the majority of cases, he has received the preaching of the missionaries.

**Africa.**—Under the auspices of the *Church Missionary Society*, an association instituted in 1799 in connection with the Church of England, mission-stations were established at Sierra Leone. The yellow fever decimated their ranks, and they found a hard and thankless soil in a population brutalized by the slave-trade. In Egypt and the East little progress was made among the Mohammedan inhabitants, but some Jews received the Word. Many of the triumphs of African exploration, of which a summary will be given afterwards, were won by men who braved the cruel deserts, and the more cruel nations of these torrid lands with the Cross in their hands. Of these the Prince is David Livingstone, a medical-missionary. In 1829–30 Gobat penetrated the stony heart of Abyssinia ; and later, Krapf tried perseveringly to make some impression upon the eastern side of this vast region of idolatry, acting from Aden and Zanzibar as centres.

**India**, to which reference has been already made, has been a favourite mission-field with all denominations. Rhenius, who was at first connected with the Church Missionary Society, toiled in the southern part of the Deccan for a quarter of a century. So bitter did the Hindoo priests become, that a secret society was formed called *The Ashes*, consisting of devotees, who swore by the ashes of Siva their god to wage ceaseless war on the Christian preachers. They murdered, burned, and plundered in fulfilment of their vow.

The work of Christianizing India has during the present century received important aid from the Church of Scotland, and that great communion which seceded at the Disruption of 1843 under the name of the Free Church. The man, whose name has been most prominent in this work, has been the Rev. Alexander Duff, who through storm and shipwreck made his way to Calcutta in 1829, in the capacity of Head-Master of a new institution for the educa-

tion of native children. This seminary, opened in the following year, contained a preparatory and a collegiate department. English was made the medium of instruction ; and the teaching of science was used to undermine the false philosophy, which in the Brahminical books is closely interwoven with the Hindoo religion. The grand object of the seminary was to rear up a band of trustworthy *native* teachers. The minds of many young Hindoos of the higher class were awakened to the discussion of truth, much to the terror of their parents, who saw them refuse to be invested with the sacred Brahminical thread. The institution increased to 900 pupils ; and the education was of so high a class, that even the dread of seeing their children converted to Christianity was neutralized by their desire to secure for them the benefits of the knowledge conferred by the English school.

A Bombay mission, previously connected with the Scottish Missionary Society, was in 1835 transferred to the Church of Scotland ; and schools, similar to Dr. Duff's at Calcutta, were established there and at Madras, with various branch-seminaries adjacent. Not without strenuous opposition did the Hindoos permit such mighty engines of good, as these schools proved, to be planted in their midst. Youths, who were awakened to a sense of idolatrous errors, were often chained and flogged, until they fled for refuge to the missionaries' houses. Mobs collected ; and threats were denounced against the English, who, as alleged, had tampered with minors and detained them forcibly. Hindoo meetings denounced the schools. But all was vain. The plan of a great Hindoo School, in opposition to the Christian seminaries, collapsed ; and although, on the occasion of a baptism in the school, there was a temporary withdrawal of pupils by timid parents, the numbers soon swelled up again ; and the work of education went on as efficiently as ever.

At the Disruption all the Indian missionaries went over to the Free Church ; but this only doubled the agencies for the evangelization of India, for while the Church of Scotland despatched new men to occupy the stations already formed, the Free Church, in whose ranks Dr. Duff was a foremost champion, sent out a faithful staff to continue the



good work. It is impossible to form a true estimate as yet of the good done by these agencies. The seed is but newly sown. But a young India is growing up, leavened with that new knowledge that cannot die ; and to the constant spread of a spirit of intelligent inquiry we look with hope that a real impression has been made upon the outworks of the strongest—because the most learned—fortress of idolatry in Asia.

The seal was set to the charter of religious liberty in 1850, when the Earl of Dalhousie, the Governor-General, enacted (an extension of Lord William Bentinck's regulation of 1832) that "forfeiture of rights or property, by reason of renouncing any religion or being deprived of caste, should cease to be enforced in India."

**Other Agencies.**—It would be unjust, though we must content ourselves with the merest mention of them, to omit noticing the missionary efforts of other lands.

At Amboyna, Timor, Celebes, and other stations, the Dutch have maintained preachers of the Word. The Germans, besides contributing many devoted missionaries to the English Societies, have chosen Russia, Western Africa, and India as their fields of labour. The Protestants of Paris have sent the good tidings to the Bechuanas, and other tribes of Southern Africa. To the Americans also of every denomination is due the praise of having taken a large share in forwarding the spread of the Gospel, not only among the red men of their own forests, but wherever missionary operations of magnitude could secure a hold.

## CHAPTER X.

## ADVANCES IN SCIENCE AND SOCIAL LIFE.

**Astronomy.**—Nothing in our century has contributed to advance the knowledge of Astronomy so much as the magnificent telescope erected at Birr or Parsonstown in Ireland by the Earl of Rosse. Combining with wealth and deep mathematical knowledge, an aptitude for mechanical invention which alone would have raised him to eminence, this nobleman succeeded, in 1845, in completing what may be truly termed a wonder of the age.

Between two massive stone piers, sixty feet high, hangs a tube—or tunnel rather—made of deal staves an inch thick, braced together with rings of iron. A man, with an umbrella up, has walked through this tube, for it is eight feet in diameter. The telescope is of the Reflecting kind, in which a most important object is the construction of the *speculum* or mirror. After a previous success, resulting in a speculum of three feet, Lord Rosse cast and polished a giant speculum, weighing four tons, and measuring six feet in diameter. It was formed of copper and tin; and planed into perfect form by a steam-engine adapted to its work by the Earl himself.

Through this colossal instrument the mountains of the moon are clearly visible; we see in Saturn “the old and new ring, which is advancing with its crest of waters to the body of the planet;” we behold Jupiter blazing “like a coach-lamp;” and those strange spiral *nebulae*, which are as yet a puzzle to astronomers.

Simultaneously the researches of Adams at Cambridge and Leverrier in France added a planet *Neptune* to those already known. Asteroids in great numbers have also been recently discovered.

**Microscopic Science.**—Dr. Chalmers, with that vast

grasp of expression which characterized his eloquence, places the Telescope and the Microscope thus together, in a striking antithesis :—"The one leads me to see a system in every star ; the other, to see a world in every atom." While Lord Rosse was revealing worlds unsuspected on what seemed, but were not, the very skirts of space, an instrument was placed in our hands—the Achromatic Compound Microscope, constructed about 1823 by Chevalier—which exhibited the Infinite in another extreme,—the extreme of smallness.

By the application of the Drummond light, the Oxy-hydrogen Microscope was produced in 1832. A stream of oxygen and hydrogen, mixed and kindled, was projected on a piece of lime ; and the intense brilliancy of the light thus caused brought out the magnified objects with startling distinctness. The sting of a bee became a harpoon ; the goad of the horse-fly, a sabre ; a drop of water teemed with dragons and serpents ; an infant's hair showed like the barrel of a blunderbuss.

To enumerate all the uses of the Microscope is impossible. It detects a murder, by proving the little neglected spot to be of *human* blood ; it detects adulteration in food, and poison in apparently harmless substances ; it reveals the strange structure of the living cells, which make up the animal and vegetable frame. To every man of science it is an indispensable auxiliary.

**Gun-Cotton, &c.**—Among the inventions of the century is Gun-Cotton, first described in England in 1846 by Professor Schonbein of Switzerland. It is made by soaking cotton fibre in strong nitric acid, then washing it thoroughly, and drying it at a low temperature. An American professor steeped a linen handkerchief, and converted it into this explosive. He then sent it to be washed and ironed ; but at the first touch of the hot iron it went off in a flash of fire, astonishing the poor laundress beyond measure. The destructive force of gun-cotton was proved by Schonbein to be much greater than that of gunpowder, and it leaves but slight traces behind. Its further advantages are, that by slight moisture it can be rendered unflammable for *safety of storage* ; that it neither fouls nor heats a gun ; and

with the same projectile force has much less recoil. The British Government have only very recently begun to make inquiry into its good qualities. In blasting it is most useful; for one-sixth weight of cotton will produce as much effect as a given quantity of powder, while it does not load the air with smoke—a matter of great moment in tunnels and mines.

**Lighthouses and Lifeboats.**—As men have begun in the present century to use the Sea more actively than ever for a highway of Commerce, they have placed on each most dangerous rock that lies adjacent to the shore,

“A ruddy gem of changeful light,  
Bound on the dusky brow of Night.”

Last century witnessed the triumph of Winstanley and Smeaton in the erection of the Eddystone: *we* can boast of the Bell Rock and the Skerryvore.

The former was built in four years (1807–11), on a dangerous reef at the entrance of St. Andrews Bay. It is constructed of granite, cast-iron, and plate-glass. The latter, situated among the Southern Hebrides, was completed in 1844. The building of a lighthouse is a ceaseless battle with the sea; and many a time the workmen at Skerryvore heard the wild waves pouring hungrily over the roof of their wooden shed at night, and felt the straining timbers tremble.

Behind the lamps are bright concave reflectors, which by a certain concentrating arrangement exceedingly multiply the power of the light. The Drummond light is so powerful that it can be seen sixty miles off; but, though invented more than thirty years since, it has not been generally adopted. In the construction of Wolff Rock Lighthouse, off the Land's-End—one of the latest works of the kind (1862)—the stones are dovetailed together, and united by hydraulic cement, so that they may be broken, but cannot be sundered.

The Lifeboat, in its invention, belongs to the last portion of the Eighteenth Century, having been first formed in 1789, by Henry Greathead of South Shields. It is raised at stern and bow, and made more buoyant with cork. In

more recent and improved boats the sides are lined with water-tight cells of gutta percha, or some similar material. These boats are so constructed that, if overset, they right themselves, and empty out the water through apertures in the bottom. Each rower is equipped with a life-belt and cork jacket.

But if the Lighthouse fail to warn the ship, and the Life-boat to secure its mails or treasures, our century, in the Diving-Bell and Diver's-Dress, has produced a means by which these spoils can be rescued from the bottom of the sea. Waterproof cloth having been made, the next step of progress was the discovery that under water a weight could be borne which would utterly prevent a man from moving in air. A diver's-dress was therefore invented, consisting of water-tight India-rubber, into which a pipe from above conveyed air. A copper helmet, with glass eyes, or rather windows, though its weight was fifty pounds, sat lightly on the diver's shoulders, as, to the amazement of the fishes, he walked quietly about on the deck or through the cabins of a sunken ship, filling the baskets, which his fellow-workers on the surface of the sea sent down, with gold, gems, wine, documents, letters, and all he could take from the wreck.

The Drummond light has been mentioned ; and in an earlier chapter the first efforts to light our streets with coal gas received due notice. It took, however, a considerable time to introduce gas into dwelling-houses. Nor was this wonderful, when we consider that it was at first so badly made that the smell was most offensive. Its general introduction belongs to the middle decades of the century. Decomposed in iron retorts, cleansed from tar, &c., in the condensing main, and forced through lime for the purpose of further purifying it, the gas is stored up in great tanks, whence a system of pipes carries it throughout the city. In each house is a meter, by which the quantity of cubic feet used is measured. The value of the gas consumed in London every year is nearly two millions of pounds. There is no doubt that the use of gas has co-operated with our modern police force in clearing our streets of the audacious thieves who swarmed in cities during the time of the private lantern, and its successor, the dim oil-lamp of Dr. Johnson's

days. The application of gas to cooking has been adopted in many of our larger hotels and public rooms.


Then in the kindling of fire, too, Chemistry has supplied us with many facilities. Instead of the old-fashioned tinder-box, with its flint and steel, came a match, which broke into light on being pulled sharply through a doubled piece of prepared paper. For a time this new invention was shown as a novel experiment by chemical lecturers, whose audiences burst into applause when the magic light was struck. But the utility of the phosphoric match for domestic purposes soon became widely known ; and, as gas came to be in every house the common light, so a box of matches lay always at hand to kindle the light. It is a simple matter to us to strike a match and light the gas ; but the power of doing so is nevertheless one of the wonders of the Nineteenth Century. How Goldsmith and Johnson would have stared if the drawer (waiter) in the Mitre Tavern, when summoned of a summer evening to light the low-ceiled room in which they sat over their glass of port, had drawn from his pocket a splinter of wood, tipped with a little blob of dark-shining substance, which, when rubbed along a sanded paper, broke into a brilliant blue flame ! And how their eyes would have opened wider still, when the little torch, so magically set on fire, was applied by the wizard to a pipe descending from the ceiling, with the wonderful result of calling into existence a blossom of steady light, worth half a dozen candles in the brilliance of its rays. So much for the Lucifer Match.

**The Penny-Post.**—Previous to the year 1840 intercourse by correspondence was so expensive, or so hampered with inconveniences, as to be comparatively very rare. People were driven to deceit in order to ascertain for nothing each other's existence or welfare. Newspapers, going free under the frank of a Member of Parliament, were covered in every blank space with close writing in milk or lemon-juice, which became legible under the influence of heat or other means of change. Merchants wrote several letters on one sheet, and these their agents cut up and distributed ; and poor people were driven to such shifts as that of sending a blank sheet addressed to a friend, who, when the postman offered it, knew,

by the very fact of the inclosure being in the postman's hand, that the dear one was alive. It is said that an incident similar to this met Coleridge in the Lake district, and by him was communicated to Rowland Hill, the real author of the Penny-Postal System.

This gentleman, the son of a schoolmaster in Birmingham, became possessed with the idea of establishing a cheaper and more frequent mode of communication. Publishing a pamphlet, bristling with facts and calculations, he began to ventilate the subject of a reform. He ascertained, as one fact, that "the cost of transmitting a letter from London to Edinburgh (four hundred miles) was only 1-36th of a penny," and yet the postage was a shilling. His calculation was, that instead of loss the Post-Office would gain largely by the increase of correspondence, if the charge were reduced to a penny. The idea of a stamp, paid for beforehand, was readily seized, for it saved the expense of collection. The letter-box was another idea, greatly facilitating the speed of delivery. The idea of a Penny-Post took wonderfully with the public. Merchants, bankers, societies, and public bodies of all kinds, petitioned Parliament in its favour with such success that the Ministry were forced to yield to the pressure from without. In August 1839 the Penny-Postal System was established by law. A fourpenny rate formed the transition by which the low rate was finally reached, and an envelope was designed as a cover for letters; but the plain queen's-head in red came soon to be adopted as the symbol of this great public boon. The victory of those advocating the new system was signally triumphant. Within two years the revenue of the Post-Office reached two-thirds of its old amount; and, when Rowland Hill was made secretary to that institution, he had full opportunities of working out minute details of improvement in the system.

**Sanitary Reform.** — In 1831 the gloom of a coming terror spread over, not only England, but all Europe. The *Cholera* was a word which made every cheek grow pale; and no wonder, for, as heralds of the advancing plague, *flew stories* of its cureless nature, its sudden fatality, its terrible contagion. Boards of Health issued alarming placards, ordering a tainted dwelling to be marked with



words of caution ; as in the old days of the Black Plague a red cross had been chalked upon the shut door of a stricken house. When the epidemic came, it was found that its terrors had been greatly exaggerated. Of the better-fed and better-lodged classes it attacked but few, and these in exceptional circumstances ; but upon the squalid dwellings in great cities, where the poorest huddled together, the scythe of the Destroyer fell with fatal sweep. Happily its force abated in about fifteen months ; and as a retreating flood, destructive as it may have been in its course, leaves a stratum of fertility behind, from which good results spring, so from the visit of this dreaded Asiatic disease sprang the movement of Sanitary Reform, which found us, on its return in 1849 and later, well prepared, with wider streets, better ventilated houses, improved sewerage, increased facilities among the lower classes for bathing, washing, and the free use of air and light. That in these respects all even yet is not as it should be is unquestioned ; but that great advances in Sanitary Reform have been made during the last thirty years is equally beyond a doubt.

**Photography.**—From the *Horn Silver* (lunar caustic) of the alchemists, which blackened on exposure to light, sprang in our century the Photograph. Scheele, about 1777, found that this substance became blacker in the violet than in the other rays of the sun. Watt, of steam-engine celebrity, had ideas of the sun-picture. But it was reserved for Niepce of Chalons-sur-Saone, in 1814, to produce an impression by the rays of the sun on a chemically-prepared surface, and thus lay the foundation of what is now a popular art. He called the process *Heliography*. Almost simultaneously, in 1839, Fox Talbot and Daguerre applied this discovery to the production of likenesses. Upon paper made sensitive with nitrate of silver, the former made beautiful and perfect copies of leaves and flowers ; while the latter experimented on a silver plate prepared with the vapour of iodine. In those early trials the plate lay often twenty minutes in the camera ; now, a few seconds complete the operation. The invention of gun-cotton in 1846 by Schonbein greatly advanced the art of Photography ; for, dissolved in ether, that substance makes the *collodion*, which is always now



used to produce a sensitive surface. Besides its domestic uses in supplying us with miniatures of our friends and the faces we like best to know, this wonderful art helps the law in the detection of crime, and is a powerful aid to the traveller, the engineer, and the man of science. So rapid is its action that an instrument called the *Pistolgraph* has been described, which, presented to a passing face, picks off a likeness in the clicking of a trigger. To preserve the photograph from fading as years go by, and to produce a picture in its colours, are among the unsolved problems of the art.

**Police, &c.**—The detection of criminals has been spoken of in the preceding paragraph. Owing to the lighting of our streets with gas, and the organization of a watching force or police, more worthy of the name than the system which selected decrepit old men to be the guardians of the public peace at night, crime has diminished; and the facilities afforded for capture by steam, electricity, and photography are so numerous, that many, who may have the inclination to thief, are deterred by the dread of certain arrest. Our punishments have also undergone a righteous change. At the beginning of the century a thief or a forger incurred the penalty of death equally with him who had shed a human life. But such a stain has since been wiped from our statute-book; and at the present time a law has come into force, by which capital punishment must be carried into effect privately. This will do away with one of the chief arguments against the utmost penalty of the law—an argument based on its demoralizing influence upon the callous crowds, that gather to see a man hanged as they would attend a theatre or race-course.

## THIRD PERIOD.

### THE IRON AGE.

(1854-1868.)

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### CHAPTER I.

#### IRON SHIPS AND GUNS.

THE present generation has been aptly termed the IRON AGE, since it has developed in a remarkable degree the applications of the most useful of metals. The arts of Peace and War have profited alike by the labours and inventive skill of our engineers ; but it is in the latter arena that the changes have been most striking, and the success of the experiments most conspicuous.

Little dreamed the prophet, when, by the exercise of miraculous power, he made an iron axe-head to swim, that the day would come, when ships of iron should not only float upon the sea, but should stem the waves of an ocean, whose very fringes no eye of his nation had ever beheld.

An ingenious smith named Wilkinson constructed in 1787 a small canal-boat, which was the first attempt at applying iron to such purposes. In 1815 an iron-boat, the work of Jevons, was shown as a wonder upon the Mersey. But it was not until 1821 that an iron-ship actually sailed upon the sea. This was a steam-vessel, originally made in parts and put together in a London Dock, whence it steamed to Havre and up the Seine to Paris. Other steps of progress followed. In 1838 a steamer, the *Manchester*, was built ; and for threading the windings of the Niger a Liverpool firm built a vessel called the *Alburka*.

The question whether iron or wood should be used in build-

ing ships of war soon attracted the notice of the Admiralty, who, in their first experiments, imagined that they found the latter to possess advantages over its intruding rival owing to the iron not being thick enough to resist shot. So the "wooden walls of Old England" still floated for a time, reminding all beholders of Blake and Nelson, and the glorious list of names dear to naval glory. But this was only a temporary check in the triumph of Iron. The Chinese War, closing in 1842, brought the subject to a practical test; and solved at least one of the problems started by those engaged in the controversy—namely, that an iron ship is *not* shaken into leakage by the concussion of heavy guns fired from its decks. This settled one part of the question; but there remained the difficulty of reconciling in iron-plating a lightness that would float and a strength that could resist cannon-shot.

Each successive war has since added its experiences of the extraordinary uses to which it is possible to adapt iron in warfare. During the Russian War the Emperor Napoleon III. exchanged some of the wooden ships of the French navy for iron-plated floating batteries, upon which shot and shell, as these were then made, produced but little effect. The rapid improvement of rifles and cannon made it necessary to oppose shot with something stronger than wood. The Minie rifle with its conical bullet, and the Lancaster gun were the newest arms of that period. But the engineers Whitworth and Armstrong rose with the occasion, the former producing a rifle that shot stronger and surer than the French invention, while the latter invented cannon, throwing bolts of many hundred pounds in weight to enormous distances, with a force that penetrated four-inch iron plates backed with a cubit of solid teak as easily as if the resistance had been offered by a sheet of pasteboard.

Then arose the question, "How are shot and shell like these to be met?" The answer was evident: "We must clothe our ships and our fortresses in armour." A strange reverse! For it was the invention of gunpowder and the gun which chiefly operated to cause the disuse of the heavy armour that had sheathed the mediæval knight; and now *the advance* in this "mystery of murder," the science of

destruction, has led to the introduction of a new kind of armour, not for the bodies of men, but for the hulls of ships and the walls of fortresses.

France and Britain soon began a rivalry in this novel application of iron. Our neighbours built *La Gloire*, a timber ship, clad with iron plates more than four inches thick; we turned out the *Warrior*, a vessel of iron frame, with an inner skin of the same metal, a backing of solid teak eighteen inches thick, and plates as thick as those of *La Gloire*. It must be remembered that in these two vessels the armour covers only part of the hull.

Captain Coles designed an ironclad of novel construction, which is called the Turret-ship. Lying low in the water, with bulwarks which can be lowered by hinges into the sea, such a vessel presents a smaller mark to the enemy's shot. Its guns, generally of enormous weight, are placed on deck in massive shot-proof turrets or cupolas, which revolve on a pivot fixed in the keel, and by their circular form cause the enemy's shot to glance off. By the attached machinery the gun can be rapidly turned in any direction; and by moving the port-hole while the piece remains stationary, it can be loaded without danger to the gunners. In some of the turret-ships there are steam-engines to distribute air through the vessels, for the decks need to be fastened down at sea.

The recent American Civil War gave an opportunity on a grand scale for practical experiments in the collision of Ironclads. The duel in 1862 of the *Merrimac* and the *Monitor*, off Norfolk harbour in the United States, startled the minds of those who had not been observing the progress of iron-shipping. The former vessel, plated by the Confederates with railway iron, and armed with two sharp iron teeth at the prow—after the manner of the brass-beaked galleys of the ancient world—rushed invincibly about, like a great sea rhinoceros, goring wooden ships to death with the horn of her might, until there was seen, floating from the North, a strange dark object, like the roof of a submerged house with a violently smoky chimney. This was the advancing *Monitor*, a turret-ship, whose revolving cupola bore two guns, of bore nearly a foot in diameter.

The *Merrimac* engaged ; tried her iron teeth to no purpose ; rattled showers of harmless shot on the iron armour of the Federal vessel, and was finally forced to retreat, grievously shattered, yet untaken.

In the construction of ironclads the British and the Americans vie with each other in the invention or application of new systems. The English engineer prefers to make his armour of solid plates of rolled iron, with a thick wooden backing strengthened by iron bars, and defended on the inner side by an iron skin. The American makes laminated armour, by placing thin plates over each other to a certain thickness, and then adding the wood and inner skin. The nations differ also in their modes of attack. John *punches* his foe—a process consisting in the use of shot and shell, which penetrate the sides and sink the ship. Jonathan *racks* his antagonist, by flinging such masses of weight against the plates that they are shaken asunder and finally broken.

It was soon manifest that ships must be clad *completely* in armour. The *Achilles* and the *Minotaur* belong to this class. But perhaps the strongest vessel in the British navy is the *Royal Sovereign*, whose turrets are armed with plates ten inches thick. The fact that the weak point in an iron-clad is the bottom, and the danger of any injury sending the whole crew down to inevitable death with the sinking vessel—for they are shut securely in during action—caused engineers to introduce the “double-bottom, or unsinkable principle.” A ship upon this plan is a vessel within a vessel, its outer hull and inner being more than a yard apart ; and as in the old walled cities, when the rams battered down a barrier of masonry, another twice as strong stared grimly at the discomfited besiegers, so a destructive rock tearing from below, or a shot fired downwards and ripping the side below the water’s edge, proves harmless, there being a second defence to avert the peril.

The introduction of the *Gun-boat* into naval warfare has been partly the result of Baltic experiences during the Russian War. By means of these small and light vessels, moved easily by the submarine screw, a fortress can be shelled from a short distance without affording the heavy

ordnance of the batteries more than a chance shot at their tormentors, which circle and fire within easy, yet to them safe, range.

**Forts.**—When the cannon were roaring round Sebastopol in 1855, no one dreamed of any other kind of permanent fortress but that used from distant times—the solid work of cemented masonry. The forts at Cronstadt and Sebastopol, granite though they were, withstood the shock of 50,000 shot and shell; and even the earth-works, that were raised at various points as means of temporary defence, became only the firmer and stronger from the masses of iron that went ploughing to their heart. But, when projectiles, weighing from 300 to 600 pounds, formed of steel, and discharged with enormous charges of powder from rifled cannon, came into use, it soon appeared that stone fortifications would be splintered into shingle in a few hours, and that something stronger and more enduring must be devised; in short, it was found that forts must be Ironclads too.

At Shoeburyness in 1865 a grand trial took place. Two casemates, one of granite, the other plated with iron shields twenty-one inches thick, were bombarded with heavy guns. After the firing it was found that the granite, though fired at with cast-iron only, was so crumbled and shattered as to be beyond repair; while the iron shields, though pierced and distorted by the steel bolts discharged against them, were still capable of repair, and might be made even stronger by the additional thickening of the plates that would ensue from the patching. It was found, too, that the dust and splinters of granite would have hindered the working of guns behind that defence, while the iron was torn, but not shattered. The earth-work is now assailed, and almost always destroyed, by heavy shells containing a strong charge. Plunging into the soft bank, one of these explodes, and scatters the rampart in a shower of clay.

In the Isle of Wight the forts have been coated with armour. Round the massive battlements of granite and concrete is a facing of fifteen-inch iron plates, rivetted to the stones, and pierced with holes. There is but little semblance of a building in the gray iron box, crowned with conical turrets, which has taken the place of, or rather has

grimly swallowed up, the trim stone batteries once to be seen. In the shelter of each revolving turret lurk eight enormous pieces of ordnance, made to hurl conical steel balls, one of which four men cannot lift; and even if the turret should be rent and perforated, it is so constructed that it will still revolve, and the guns within be as safe and as destructive as ever. There is in the smooth gray surface no hold for a climber: iron gun-boats will circle round them as skirmishers and sentinels; and, if the line of these defenders should be passed, there is a deadlier ring of defence in the electric torpedoes, which swing under the waves, ready to burst into destructive explosion at the least concussion of a keel.

**Guns and Missiles.**—In 1859, after the Italian War and the Indian Mutiny, the military authorities of Britain turned their attention to the improvement of the artillery arm. The siege of Sebastopol taught them and the rest of the world many lessons, which Britain was not slow to improve. Sir William Armstrong of Newcastle offered the Government a new cannon, which was accepted. The gun was not cast, as in old days, but “built up coil by coil and ring by ring”—an idea borrowed from old founders of cannon, who were accustomed to strengthen a weak piece by coiling cables, or, what was more efficient, iron bars, round the weak cylinder or barrel. Cast-iron and brass were now disused; and steel or the finest iron came to be the favourite material for making cannon, which, being obliged to throw a ball or shell of enormous weight, required strength to resist the explosion of a monstrous charge of powder. Mr. Whitworth soon became a rival of Sir William Armstrong in the manufacture of cannon. This eminent engineer and inventor constructs a steel cannon, whose breech is screwed in, the threads being so exquisitely fitted as to produce the effect of a single piece of metal. In the course of Whitworth's experiments for the manufacture of his guns, he invented a means of measuring the *millionth* of an inch, and “produced absolutely true planes, which may float on each other, separated by a thin film of air; or, if this film be pushed aside by sliding the top plate forward instead of *placing it at once face to face with the lower one, the two will*

adhere together, as if made of one piece." Krupp of Prussia has built a gun, steel of course, which discharges a ball weighing half a ton, and takes a charge of gunpowder weighing one hundredweight.

A great improvement in both range and accuracy of fire has been obtained by rifling these cannon. This is done by boring the barrel with a spiral groove, which communicates a revolving motion to the shot, thus sending it straighter, stronger, and further.

In regard to the Projectiles used, cast-iron has now been quite discarded, for it either flies to pieces on the iron target or rebounds harmlessly. Nor is the shape any longer round, though some of the American gunners persist in adhering to that form. It has been found, so far as form goes, that an elongated shot or shell with a pointed head, like the apex of a sugar-loaf, cleaves the air best, and dashes with fiercest velocity into the opposing mass of iron plates and teak backing. Whitworth proposed a flat-headed cylinder, but the pointed head has a great advantage, for it acts as a wedge rather than as a punch. These projectiles are frequently hollow, and contain a bursting charge, which the shock of concussion ignites: so formed, they are called *shells*. Such missiles must be made of hard metal; for "a cast-iron shell is of about as much use against a good iron plate as a pat of butter would be." Major Palliser has proposed chilled iron as a material for shot and shell: it has all the toughness and hardness of steel, at a fraction of the cost.

Having thus at length discussed the Cannon, let us turn to the Breech-loading Rifle—a wonderful improvement on the old musket of Waterloo. By means of this arm, the specialty of which consists in the opening of the barrel towards the breech, so that a ready-made cartridge can be slipped in instead of the tedious and troublesome process of ramming powder and ball into the barrel by the muzzle, the speed of firing is increased fourfold. The volleys, that is, are as frequent, and the bullets rained on the foe as numerous, as if the army firing had been four times the size. Lurking under a rock, the skirmisher can load without exposing himself to danger; or the rifle, in action, can be loaded and discharged without even moving the bayonet from its aim at the breast.



of an advancing foe. To such advantages may be added the comparatively slight strain on the energies of the soldier while loading—a lessening of fatigue which enables him to shoot better and fight longer. It is well known that, on the morning of Waterloo, a great number of muskets, loaded the previous night, were so wet by the torrents of rain, that the soaked cartridges would neither explode nor suffer themselves to be drawn. It seemed to the dismayed officers that there was nothing left but to depend on the cold steel, until a clever sergeant discovered that, by whirling a gun round his head, the cartridge was loosened and driven towards the muzzle. And then was seen among the trodden rye the strange sight of British soldiers whirling their guns, until the line resembled a row of miniature wind-mills. Such a trouble cannot befall the modern soldier, for to extract the cartridge from a breech-loader is the simplest thing possible.

The Breech-loader, which as yet has attained chief historical importance, is the *Needle-gun* of the Prussian service, which, at Sadowa and elsewhere, withered up the Austrian lines so signally during the Six Weeks' War of 1866. The invention of this fire-arm has been claimed by several persons. Moser of Kennington; Hanson of Folly Hall near Huddersfield; Dreyse, a Prussian; Descontures, a Frenchman; and Montigny, a Brussels gunmaker, have all put forward claims to the honour. Whoever first struck on the idea, it fell into the hands of the Prussians, whose soldiers were furnished with the arm in 1848. The principle of the gun is simple. Instead of igniting loose powder by the fire of a percussion-cap driven down through the nipple, a cartridge, which contains some detonating powder in front, is discharged by driving a needle from behind through the cartridge. In order to keep the barrel from fouling, the bullet is enclosed in a *sabot*, or shoe of pasteboard.

All the Great Powers are now arming, or have already armed, their troops with breech-loaders, for the war of 1866 proved the utter uselessness of any soldiers with the muzzle-loaders standing before a fire of breech-loaders. We have the Snider rifle; called after the inventor of a cartridge, who *died in 1866*, partly of vexation at the inadequate remuneration

ation offered him by our Government. The Emperor of the French has chosen the *Chassepot* rifle, which can be fired by a man, who has the cartridges ready to his hand, twelve times in a minute. This rate, however, is at high pressure of nerve and muscle, and cannot be maintained longer than two or three minutes. We are told that, at an experimental trial of this weapon before Napoleon III., a battalion of 500 men fired 8000 balls in *two* minutes; and that, at the distance of 600 yards, 1992 of the bullets had struck the line of aim. Every blade of grass in front of the target was destroyed; and the Emperor cried out, "It is frightful—a perfect massacre."

Among the curiosities of gun-invention is the cannon of Steinheil, who applied centrifugal force—the same that hurls a stone from a sling—to the propulsion of heavy balls. The motive power is a revolving disc. There has been talk, too, of a steam-gun, or ball-pump, which discharges a ceaseless shower of balls.

We must not forget to notice the *Revolver*, a pistol with a single barrel, but many chambers, which in turn discharge a bullet. It originated in the United States of America, where the passion for duelling made the six-shooter an acceptable boon. The subject of gunpowder, too, is attracting the attention of chemists, one of whom in France has invented an explosive compound, with no ingredient of common powder in it. To this he has given the name *poudre blanc*; and it is said greatly to excel the old invention.

Though the *Torpedo* (so called from the electric ray of the Mediterranean) was known earlier, it came into very active play during the recent Civil War in America. They were thickly planted in the Southern rivers, so that Federal gun-boats might be torn to pieces by their explosion. These destructive engines are of different kinds, which resolve themselves, however, into two classes, differing as to their method of ignition—electricity and detonation.

In exploding the former kind, the electric spark is either communicated from a battery on shore, at the moment when the ship is exactly over the place of the torpedo, or the charge is fired by the concussion of the vessel striking upon a stud to which a spiral spring is attached.

Torpedoes are used also to spring a mine on land. In the recent American War, Richmond and other cities were fortified with a sunken ring of these secret engines, which excited more terror in the beleaguering hosts than did all the visible defences of cannon and breastwork. In mining below the walls of a besieged city, the engineers engage in a most hazardous task; for the torpedo, which they are burrowing to lodge beneath some defence at whose destruction they aim, becomes in the hands of the besieged a potent engine of destruction. Hearing their muffled talk or the dull sound of their pickaxe, a sentinel may call his comrades in; may sink his gallery below the spot where they are moling, and inserting a couple of slender wires, may remove to a safe distance, and, as Shakspeare says, "blow them at the moon."

At Woolwich may be seen in every condition, from the rough beginning to the smooth strong finish, the manufacture of those terrible appliances which belong to modern warfare. The Fraser Gun, which is now adopted in our service, is coiled and welded into shape in various forges, where may be seen at work that wonderful instrument, without whose Titanic force neither heavy gun nor ironclad could exist in their present strength of attack and defence—the Steam-Hammer of Nasmyth. This tool, if such be not too weak a word for a power so great, is so delicate that it can crack a nut without crushing the kernel, and yet so strong that it can drive into the earth in *four minutes* a pile, which would have previously exacted *twelve hours* in securing the same result, and can forge the sheet-anchor of the largest ship in a wonderfully short time.

At present (1868), experiments on the most stupendous scale are going on at Shoeburyness, four miles from South-end in Essex, to test the relative powers of heavy artillery and iron plates, as applied to the fortification of land-batteries. The Government, having resolved to arm Plymouth Breakwater with iron-plated shields, have afforded an opportunity of trying a section of the defences prepared in the Atlas Works at Sheffield. The target, at which guns were discharged from a distance of two hundred yards, *though no enemy could approach nearer than five hundred,*

consists of iron plates, five inches thick, screwed together to the number of three, and sometimes four, and backed with a strong inner skin of concrete, with iron supports behind, making the defences in some places nearly a yard thick. Against this massive barrier the principal guns used have been a rifled Fraser gun, made at Woolwich, and a cannon of American construction, named from General Rodman. The former, 15 feet in length, throws a steel conical shot or shell weighing 600 lbs., and takes a charge of 76 lbs. of powder; the latter, hurling a round-shot of 450 lbs., is loaded with 50 lbs. The result of the contest has been to decide, so far as the guns are concerned, clearly the merit of the English over the American cannon. The steel or chilled-iron cone penetrated two of the iron plates, seriously injuring the third; while the round Rodman shot either made a dent some inches deep, and fell in front of the target, bruised out of all shape and glowing almost red-hot, or, at most, fixed itself like a huge bagatelle ball in its cup, and stuck there. The superiority of *rolled* in comparison with *hammered* iron, in the defensive plates, has been clearly proved by these experiments: for, while the hammered iron, struck with a 12-inch shot, broke in half, two masses, weighing five tons each, being driven twenty feet asunder; the rolled iron so withstood the same blow, as to present merely a dinge ten inches deep with a bulge behind. It is notable that the points of the chilled-iron conical shot were not broken by these inconceivably violent collisions.

Enough has been said of the terrific power Iron is wielding in our age as the material of war. The contests of a coming struggle will be absolutely Titanic. It makes us pause in awe to think how daringly puny man has grasped the thunder and the thunderbolt—or what so closely imitate them—and turned them to the settlement of his petty quarrels. To men of peace the great consolation is, that if the march of invention progresses for a century as it has recently done, war will become certain death to every soldier engaged therein; and then possibly war may cease to be waged.

## CHAPTER II.

## TYPICAL WARS (1854 TO 1866).

REFERENCE has been already made more than once to the changes wrought during the century in the mode of carrying on warfare. In the present chapter the reader is given a group of five important contests, waged within the last twenty years, and presenting in their events so many illustrative types of these remarkable changes. Beginning with the Russian and Italian Wars, which belong to the last decade, I shall afterwards describe in brief outline the American civil struggle, the Dano-Prussian War, and that short, sharp, but most decisive struggle between Austria and Prussia, which has already become known in history as the *Six Weeks' War*. Other contests—such as the Indian Mutiny and the Chinese Wars—will be dealt with more conveniently in a separate chapter on the East.

To modern warfare belong those deadly appliances of steel and iron, to a description of which a recent chapter has been devoted. There, too, we find the Railway, the Telegraph, even the Balloon utilized as a means of surveying the position of a hostile force ; and in every camp we find men skilled in the pen, writing on the spot, in many cases with a graphic brilliance seldom surpassed, the history of each turn in the great and bloody game of war.

**Russian War.**—In consequence of a dispute between Russia and Turkey regarding the Holy Places at Jerusalem, the former pushed her troops into Moldavia. France and Britain, desirous to maintain the balance of power, interfered on the part of Turkey ; and after fruitless negotiation, the two Western Powers declared war (March 1854).

In the following September, after the bombardment of **Odessa** by British ships, and the siege of **Silistria**, gallantly defended by the Turks under the direction of two British

officers, had distinguished the summer, an Anglo-French army, under Lord Raglan and Marshal St. Arnaud, sailed from Varna to Eupatoria in the Crimea, where they effected a safe landing.

Marching southward by the shore, this force encountered and defeated the Russians on the River Alma (September 20), and gathered round Sebastopol, a seaport-fortress, on which Russian wealth and engineering skill had been lavished for many years. On the 17th of October began a bombardment of terrible weight; which, however, produced but a slight effect. The Lancaster gun, throwing an oval shot several miles, was the great feature of artillery service in this siege; and the small-arm that gave the French a decided advantage was the Minie rifle, in which for the first time a conical ball, powerful to pierce and to splinter bones, came into actual use.

The port of Balaklava, lying six miles from the British camp, having been selected as the point for landing supplies of food and ammunition, a Railway was made, after some time; and an Electric Cable, laid from Eupatoria to the Turkish shore, carried the varying news of the siege rapidly to the Western States.

Before long the Russians tried to cut the line of connection between the British forces and their point of supply. On the plain of Balaklava (October 25)—now a classic word in the history of war—a fierce attack of Liprandi was turned by Colin Campbell and his “thin red line” of Highlanders, aided by the heroic charges of the Heavy Brigade and the Light Brigade of British cavalry. The latter, owing to some misconception as to the nature of the order they received, rode for about a mile down a slight slope, under a most merciless cross-fire, merely for the purpose of capturing a few cannon. Of the six hundred and fifty, at whose prowess “all the world has wondered” since, with a deep sadness, mingled with surprise, scarcely two hundred rode back alive.

On the 5th of November—an eventful Sunday—the battle of Inkermann was fought. Through the dim fog of morning 60,000 Russians pressed up the hill towards the British lines, and were met gallantly; privates, mingled with their

officers, fought shoulder to shoulder, until bravery prevailed over numerical strength, and the white-coated Russians retreated.


The winter, which then set in, fell with pitiless rigour upon the British camp. Mismanagement delayed the supplies of food, clothing, and shelter necessary to keep the troops in good condition under the severities of a terrible climate; but the army endured its lot with heroic calmness.

When the winter passed away, the besieging forces found themselves strengthened by the addition of a Sardinian army; but the Russians had taken advantage of the torpor of the winter siege to enlarge and fortify, especially with earthworks, all their lines of defence.

A naval expedition to the Sea of Azov, and a second bombardment of Sebastopol (April 9, 1855), inflicted some damage upon the resources of Russia; but the efforts of June transcended those attempts in interest and the display of valour. The day of Waterloo (June 18th) having been selected as a day of good omen, on which the French and British might reverse their old position, and fight side by side, strong columns hurled themselves upon two forts called Malakoff and Redan. The former was a white tower, encircled with spreading tiers of earthworks; the latter, shaped like a pair of compasses well opened, presented an angular face to the assault. For a time the fate of the city was delayed by the repulse of these assailants.

In August the French and the Sardinians defeated the Russians on the Tchernaya; but it was not until after the *sixth* bombardment that a fatal lodgment of the besiegers was made within the Russian lines. The credit of this success is due mainly to the French, who by a brilliant dash secured the Malakoff in fifteen minutes. The British meanwhile stormed the Redan; but owing to the want of supports were swept away in flight by a pitiless fire from the Russians (September 8, 1855). That night the besieged evacuated Sebastopol by crossing the harbour to the northern suburb.

A British fleet swept the Baltic during the two summers of the war. But the ships, bombarding Bomarsund and



Sveaborg, and reconnoitring Cronstadt, did little but keep in check the Russian navy in that water.

Circassia formed another theatre of war. There the Turks, who fought well under the direction and example of English leaders, occupied Kars. General Williams superintended the defence; but the non-arrival of an expected relief forced him to surrender with his starved garrison.

**Italian War.**—The war of 1847-48, ending with the battle of Novara, left Austria and Piedmont still hostile. All Italy, indeed, burned to shake off the foreign yoke, of whose galling presence every white-coated soldier was a symbol. In 1859 the hostile feeling grew into actual war.

After the Austrian ambassador had left Turin, the Court of Vienna summoned Sardinia to disarm. To this audacious mandate the gallant Italian State, supported by France, as whose ally she had faced the Russians at the Tchernaya, returned a defiant answer, Cavour speaking for Italy.

By their passage of the Ticino at Buffalora (April 26th), the Austrians committed the first act of overt war. In five days from that date their entire force had passed across the river into Piedmont.

From Tuscany, meanwhile, the Grand Duke had fled, when the people, keen for annexation to Piedmont, raised the tricolor; and in Modena and Parma a similar feeling produced a similar result.

As soon as Austria assumed the attitude of actual war, the French troops began to pour through the Alpine passes into Piedmont. Leaving the Empress as Regent during his absence, the French Emperor Napoleon III., kindling with the thought of reaping warlike laurels on a soil sacred to the fame of his uncle, hurried from Marseilles to Genoa, reaching the latter port on the 12th of May.

He was warmly welcomed by Victor Emanuel, King of Sardinia, in conjunction with whom he prepared to repel the Austrian invasion. At the opening of the war the Austrian forces were massed chiefly near Pavia, on the left bank of the Po, in the angle formed between that river and its tributary the Ticino; while the French and Sardinians occupied a line whose extremities rested on Genoa and Turin, while Alessandria represented its centre.



The Austrians, whose first movements were vacillating in the extreme, were soon forced by the presence of the enemy into a steady line of strategy—that of retreat. Driven back, they made a stand at Montebello; but a succession of express trains from Voghera (a novel feature in warfare) brought the French soldiers so quickly to the front, that the white-coats retired in confusion.

**Magenta.**—The French Emperor adopted a skilful style of strategy, by which he led the Austrians to believe that he meant to attack them on his right, where to all appearance he was massing his troops. When they had retreated beyond the Ticino, and he had followed them to its left bank, he managed to surprise a portion of their forces at Magenta. On the 4th of June Marshal Macmahon moved to the attack, while the Austrians, weary with the heat and faint for lack of food, toiled up to the front. The Emperor in person led a brigade of grenadiers and Zouaves to the attack of the village, and the bayonet did frightful destruction in the hand-to-hand fight that took place among the vineyards on the broken ground. Fragments of clothing and broken weapons, all red with the same awful stain, attested the fury of this four-hours' fight. The village was taken and re-taken several times during the day; every house was loopholed for rifles; and round the railway station the combat raged with a fury equalled in no other place.

The Emperor and the King soon entered Milan in triumph; and the Austrians, after being driven out of Malegnano, retreated across Lombardy to the line of the Mincio, behind which lay their famous Quadrilateral. This consisted of a four-sided district, with four great fortresses—Peschiera, Verona, Legnano, and Mantua—at the angles. Sheltered by the guns of these strongholds, the Austrians re-crossed the Mincio, and came into collision with the French at Solferino. Here was another novelty in warfare. The first intimation of this movement was conveyed to the Allies by an aeronaut, who, from the safe altitude of his balloon, witnessed the passage of the river. The Austrian line, extending over twelve miles, had its centre at Cavriana. In both armies there were fully 400,000 men.

**Solferino.**—Owing to the intense heat, the French Em-

peror began his attack early in the morning (July 24). The key of the Austrian position, Solferino, was a village on a steep hill, presenting in its old chateau and its cemetery admirable points of defence. It was finally carried by securing the little hills around, and opening with artillery from them, while the bayonet and the rifle did their deadly work. Ere the bloody day had set, the ruined walls of the chateau were crumbled by other ravages than those of time; and the cemetery was strewn with corpses not its own. During the struggle, which raged also in the plain, a fearful thunderstorm overhead was mocking the noise of cannon.

As the Allies were preparing to assail the Quadrilateral, news came of a sudden treaty concluded at Villafranca between the French and Austrian Emperors. The unbroken communication between the Quadrilateral and the Tyrol, the intense heat and failing supplies, and the French Emperor's suspicion that to push the war into Venetia would lead to a contest on the Rhine, may be accepted as reasons for this unexpected termination of hostilities.

**Italy Reconstructed.**—The immediate result of this Italian war was the cession of Lombardy to Sardinia, and the transference of Savoy and Nice to France. This was the first step towards the organization of a Kingdom of Italy, now existing, and containing nearly all the States south of the Alps. The expedition of Garibaldi in 1860 wrested Sicily and Naples from the Bourbons, and forced Ancona, in the Papal States, to capitulate. At Turin, in 1861, met the first Parliament of an Italian Kingdom, whose principal constituent parts were :—

1. Piedmont and Isle of Sardinia (nucleus).
2. Lombardy (taken from Austria in 1859).
3. Tuscany (Grand-Duke expelled by revolution in 1860).
4. Romagna, Umbria, and the Marches (once Papal territory).
5. Naples and Sicily (conquered by Garibaldi in 1860).

Austria has recently (1867) evacuated Venetia, which forms the latest addition to the kingdom, whose capital is now Florence.

**American Civil War.**—In 1860 began the great war between the Northern and the Southern States of the Ameri-

can Republic. This memorable struggle was the penalty which America had to pay for the wrongs she had inflicted upon the Negro race. In the South, slavery had appeared a highly profitable institution, and the people adhered to it with a blind, and latterly with a ferocious, tenacity. They made the most determined efforts to secure its introduction into the Territories, as the infant States of the Union are termed. In the North, slavery had been long discontinued, and a deep and growing hatred to the system animated many of the people. A vehement resistance was offered to the Southern desire for the extension of slavery into the Territories. This was the year of the Presidential election. Each section put forward a candidate who represented its views on the extension of slavery. The contest was unwontedly keen and bitter. It ended in the triumph of the North. Abraham Lincoln, a genial, profoundly sagacious, and upright man, was chosen President. The Southern States lost no time in declaring that they had withdrawn from the Union. The North refused to permit such separation. And thus the war began.

It will best serve my purpose here, if I give in a succession of sketches an outline of the most striking events of this great struggle, instead of aiming at a collection of minute and confusing details.

**The First Shot.**—On the 9th of January 1861 the waters of Charleston Harbour, in South Carolina, reddened with the flashing of artillery. This was the actual breaking of the peace. A United States' vessel, sailing past Morris Island with troops for Fort Sumpter, in that harbour, received a discharge of cannon from the battery on the island. Major Anderson, who commanded the United States' soldiers in the fortresses of Charleston, soon deemed it prudent to retire with all his men within Fort Sumpter, the strongest of the three. Here he remained awaiting help from the Government; but a storm dispersed the fleet sent to his assistance. The authorities of South Carolina, resolving on bold measures, sent against the fortress General Beauregard, who opened a vigorous fire. To this Anderson replied hotly; but, when a crumbling breach gapped the wall, and the officers' quarters were in a blaze, he felt that

there was no resource open but an honourable surrender. The Palmetto flag, adopted by the Confederates as their ensign, then fluttered out from the captured fortress, from whose pole the Stars and Stripes had fallen. (April 13, 1861.)

**First Battle of Bull's Run.**—The first pitched battle between the Federals or Northerns and the Confederates or Southernns took its name from a stream called Bull's Run, about twenty miles south-west of Washington. As must always happen, when a nation has enjoyed a long interval of peace, the various departments of the military service worked inharmoniously for a time. General M'Dowell, who commanded the Federals, complained of great delay in the forwarding of troops and food, so that he could not attack at the desired time. And the troops that came forward fell lame under a short march, being unable to carry even the usual load borne by light infantry. The attack began with a cannonade at 6.30 on the morning of Sunday, July 21, 1861. As the wearied men were greedily, and in disorder, drinking at the stream, a cloud of dust betokened the approach of a large force from Manassas. The dust soon became streaked with flame from the Confederate cannon. The contest centred round a farm-house on a hill, which the Federals held gallantly till three o'clock, though parched with thirst and weak from want of food. Just then a strong fresh force of Confederates arrived by the railway-train, and, taking post in the woods to the right flank of the Federals, plied them with musketry, till they broke and fled down the hill. The retreat became a rout: the rout, a disgraceful panic. In the crush at the fords, the rope-harness of the artillery horses was cut, in consequence of which many cannon fell into the hands of the Confederates.

**Capture of New Orleans.**—The second campaign (1862) opened auspiciously for the Federal cause. The taking of New Orleans formed their chief exploit. Commander Farragut, a name associated with some of the chief glories of the war, led a fleet of forty-six gun-boats and steam-sloops into the Mississippi to assail the great capital of the cotton-fields. The city, forming a crescent along a curve of the river, was defended by two batteries, Fort Jackson and Fort Philip, which stood below the quays on opposite banks

of the great flood. Between these stretched a defence of chains, booms, and sunken ships. For five days the Federal gun-boats rained shot and shell upon the batteries ; and, when the return fire grew slack, they forced the boom, and reached the undefended wharfs of the city. An unconditional surrender was the result.

**Duel of Iron-clads.**—The new ship, called Iron-clad, now began to take a distinct place in naval warfare. Having seized a United States' vessel named the *Merrimac*, lying at Norfolk, when the war broke out, the Confederates plated it with hammered rails, torn from the neighbouring lines ; and gave it a new name—the *Virginia*. As a shark might dart among a shoal of dolphins, this dark ungainly hull came puffing out of harbour on the 8th of March 1862, and rushed among a group of wooden ships, ripping open the side of one, burning a second, sinking another, and fuming along the edge of the shallow water, which alone prevented the destruction of the entire squadron.

Fortunately the evening brought a formidable champion of the sunken ships upon the scene. This was the *Monitor*, an iron-clad from New York, furnished with a revolving turret, carrying two 11-inch guns. The two iron-clads engaged next morning ; but the *Merrimac* tried in vain with rushing prow and raining shot to make an impression upon its mailed antagonist. All its efforts served only to cripple itself : it retreated into Norfolk harbour ; and was finally blown up by the Confederates, lest it should fall into Federal hands.

**Federal Capture of Vicksburg.**—One of the positions in the South, upon whose impregnability the Confederates prided themselves, was Vicksburg, lying by the Mississippi about half-way between the junctions of the Arkansas and the Red River with the main stream. Naturally protected by a belt of marsh and a series of ravines, it had also in the precipitous hill on which the city rose, terrace above terrace, a position of vast strength. Farragut, the hero of New Orleans, forced his way up the Mississippi, "stormed at with shot and shell," as he passed the various Confederate fortresses, and in spite of the stake-guns or torpedoes on sunken piles with which the bed of the river was thickly set, arrived at the city by

the Yazoo. For a long time the Federals wasted their strength in vain upon the rock. Sherman's army, dropping down the river in a great flotilla, was repulsed ; and it became necessary to starve the place into a surrender. The dykes of the Mississippi and its tributary the Yazoo being cut, the water, in high flood about March, rushed over the low lands, converting a vast surface into a steaming swamp. Yet the garrison of Vicksburg held out under a terrific fire of shells. At length General Grant, having fought his way to the rear of the city, assailed it furiously, while Admiral Porter shelled it from the river. Though the garrison were reduced to feed on mule-flesh, they held out for forty-eight days, when they surrendered at discretion.

**Battle of Chancellorsville.**—In the midst of dense forests of pine and oak the Federals fortified a strong position near Chancellorsville, to the north of Richmond. Here they stood at bay behind felled trees, their cannon massed upon a hill to the rear. At dawn on the 2nd of May 1863, the Confederate general, "Stonewall" Jackson, set out to make a long round for the purpose of outflanking this strongly posted force. In the evening he burst upon them suddenly, while the cannon of Lee thundered along their front. The success was decisive ; but was sadly marred by the death of the intrepid Jackson, who in the mêlée fell pierced with bullets from his own men. Next day the Confederates stormed the tree-camp ; and, when the forest took fire, the miserable men wounded in the battle suffered ineffable agonies of death.

**Atlanta.**—In 1864 Atlanta, the capital of Georgia, became one of the chief centres of interest, owing to its defence by the Confederates under Hood against a strong investing Federal army commanded by Sherman. The siege, having continued during the whole summer, came to a close in September. The armies of attack and defence came into collision fiercely several times ; but Sherman was meanwhile drawing his lines closer round the city, and "feeling for the railroads which supplied the rebel army." At length, by a skilful movement—a march to the west and a sharp eastward turn on the Macon Railway—he cut off the line of Hood's supplies. Then a Confederate mistake

placed the cavalry force at too great a distance in the rear ; the Federal horse seized their only road ; and the discomfited garrison, having blown up their magazine, evacuated the city.

**Sherman's March.**—One of the most daring and audaciously successful movements of this protracted war was General Sherman's march with a Federal army from Atlanta to Savannah. This distance of ninety-three miles he accomplished in twenty-three days. Finding it impossible to hold Atlanta, he pretended a south-eastern movement, which kept the Confederates on the alert to save Macon, a place seemingly threatened by his advance. But about twenty-five miles from that town he turned sharply to the north, and on the 22nd of November, nine days after starting, effected a junction at Milledgeville with the second column of his army. Eight days more brought him to Millen, and, while the fluttered Confederates were uncertain whether he meant to swoop upon the powder-mills of Augusta or the quays of Savannah, he pressed straight on to the latter place, off which a Federal fleet lay upon the watch. Savannah held a garrison of only 15,000 men to oppose the 40,000 Federals thus massed before her defences ; and, under these circumstances, the Confederate leader had no resource but to spike his guns, destroy the two iron-clads in the harbour, and go. The occupation of Savannah by the Federals struck a mortal blow at the cause of the South, both in a physical and a moral aspect. The exultation of the North was excessive.

**Confederates Evacuate Richmond.**—Sherman followed up his movement upon Savannah by proceeding to Goldsboro', by which he secured for the Federals all the sea-coast as far as North Carolina, and cut off the inland communications. Matters now drew quickly to a close. Burning a vast quantity of cotton, the Confederates abandoned Charleston on the night of the 17th of February. And on the 3rd of April General Grant took possession of Richmond, the capital of the revolted States. Lee then surrendered with the army of Northern Virginia. Sherman marched from Goldsboro' to pursue a Confederate force covering Raleigh ; *but it soon surrendered.* The war was over.

Thus was the Negro set free. Thus was the national life of America preserved. The waste, the bloodshed, the anguish, had been enormous. But the gain to America and to mankind was beyond all price. The assassination of President Lincoln, by an actor named Wilkes Booth, stained the close of the terrible struggle with a crime whose atrocity looms out amid all the horrors of the war.

## PRUSSO-DANISH WAR.

Previous to 1864 a claim was made by Prussia and Austria, acting for the German Diet, upon the three duchies, Schleswig, Holstein, and Lauenburg, which lie upon the neck of the Danish peninsula. The great majority of the people in these states, being German in their life, lineage, and language, supported the claim, which Denmark sturdily resisted. Early in the year aforesaid war began ; Denmark audaciously daring to face the combined might of Prussia and Austria.

Behind the Eider lay a line of fortifications called the *Dannewerke*, in which the Danes placed much trust, although it consisted merely of a single rampart with a moat. Its great purpose was to defend Schleswig from a southward attack.

The Prussians, under Von Wrangel, having collected at Kiel, crossed the Schleswig frontier on the 1st of February 1864. On the 2nd was fought a battle at Missunde, on the Schlei ; and, four days later, the Prussians, crossing the estuary in fishing-boats during a snow-storm, advanced to attack the Dannewerke in the rear ; but found it deserted by its defenders, who had left all their heavy guns behind.

When the Danes evacuated Schleswig, and the victorious invaders had occupied Flensburg, the interest of the war concentrated itself at Düppel, a strong fortress opposite to the island of Alsén. This stronghold underwent a most severe bombardment from the artillery of the Prussians, a people who have been keeping pace with Britain in the newest inventions of gunnery. One after another the four intrenched lines of the Danish position yielded to the crushing fire ; and on the 18th of April the fortress surrendered.



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unavailing, both sides prepared for actual struggle. Benedek, appointed commander-in-chief of the Austrian forces, placed his troops along the Moravian frontier, expecting to cut off easily in detail any columns of the Prussian army that might come from Saxony and Silesia through the passes of the mountains.

But the Prussians were in possession of a rifle, whose effects they had already perceived on a smaller scale in the Danish War. This was the needle-gun (*zündnadelgewehr*), whose name has become famous for the extraordinary speed with which it brought this war to a decisive close. The question as to the rival merits of breech-loaders and muzzle-loaders had been already settled practically in the turnip-field and on the grouse-moor; but never yet had the decisive settlement fallen to the terrible arbitrament of the battle-field—at least on a scale so vast as that occurring in this war.

**Invasion of Bohemia.**—On the 23rd of June 1866, the First Prussian Army, under Prince Frederick Charles, passed into Bohemia by Görlitz and Zittau. Some cavalry skirmishes and an artillery engagement served but as a prelude to the severer battle of Münchengrätz, in which the Austrians were driven back. The Second Prussian Army, under the Crown Prince, which had meanwhile been threading the defiles of the Sudetic Mountains, won similar successes over the Austrians at Nachod, Trautenau, and Skalitz.

To use the words of the Crown Prince in his General Order of the 1st July :—" But a few days have elapsed since we entered Bohemia, and already brilliant victories have been won, giving us the command of the Elbe, and enabling us to effect a junction with the First Army."

The mistake of an Austrian officer, who rashly gave battle to the Prussians and was forced to retire from his position at Gitschin, obliged Benedek, whose left flank was thus exposed, to fall back upon Königgrätz. Full of alarm, or at least anxiety, the Field-Marshal is said to have sent to his King, by the electric wire, these ominous words, "Sire! you must make peace."

**Battle of Sadowa.**—The Austrian army, whose centre occupied a hill round the village of Klum, distinguished by

a clump of trees, extended for about nine miles over undulating hills, whose slopes were in many places thickly clothed with woods. This position the Austrians strengthened, especially about Sadowa, a village nestling in orchards, with the trunks and intertwined branches of felled trees.

The battle began, about seven in the morning on the 3rd of July, with a heavy cannonade on both sides. The village of Benatek, bursting into flames, was the object of a hot hand-to-hand contest, in which the Prussians prevailed. The attack upon Sadowa and other points of the position then began. Preceded by skirmishers, the Prussian infantry advanced under a murderous fire, which they returned quickly but with only partial effect, for the Austrians were protected by houses and trees. And, when the Prussians became entangled in the woods, the shot of the Austrian cannon, tearing through the trees and sending frightful splinters in every direction, did terrible mischief. An idea of the fury of the fight may be obtained from a single example.

**July 3,** When the 27th Regiment of Prussians entered the  
**1866** wood above Benatek, it mustered 3000 men ; when  
A.D. it emerged victorious on the further side, only two officers, and not 400 men remained. At one o'clock in the afternoon the balance of the battle seemed even. Though the Prussians had forced their way at terrible cost into the position held by the Austrian flanks, it was very doubtful whether this could be maintained ; and the trees afforded no room for the use of the needle-gun.

The heat of the fight then began to centre at Klum ; and to the straining eyes of the Prussian generals all their fortune seemed to hinge on the arrival of the Crown Prince, who was to move on the Austrian right. As the Prussians, with wavering hopes, were continuing their desperate attempts to carry Klum, now red with flame, a crackle of musketry burst from the right upon the Austrians. It was the long-looked-for advance of the Crown Prince. Out of the drifting smoke comes an occasional glimpse of a dark-blue line, alive with ceaseless jets of flame, each of which wings a bullet from the deadly needle-gun. The desultory crackle grows into a furious hail-storm. Gunners fall ; horses *plunge* and die ; cannon become silent ; white-coated in-

fantry-columns, attempting to breast the hill, wither, and fall into writhing heaps. The dark-blue lines grow denser ; the storm of fire thickens ; the needle-gun has worked its way at last into the battle, and its triumph is complete. The flames of ten villages send up a terrific smoke to heaven, whose sun, smiling down on the puny wrath of man, fringes the outer edges of the rolling pall with glints of gold.

In the words of an eye-witness, "It was three o'clock. The efforts of the Austrians to carry Klum and free their centre had failed ; their right was driven down in a helpless mass towards Königgrätz, quivering and palpitating as shot and shell tore through it. '*Alles ist Verloren.*' Artillery still thundered with a force and violence which might have led a stranger to such scenes to think no enemy could withstand it. The Austrian cavalry still hung like white thunder-clouds on the flanks and threatened the front of the Prussians, still keeping them in square and solid columns. But already the trains were streaming away from Königgrätz, placing the Elbe and Adler between them and the enemy."

In Hanover too the star of Prussia was in the ascendant, for the Hanoverian troops, surrounded on all sides at Langensalza by the Prussians, were compelled to surrender. The Prussians occupied Frankfort also.

The three Prussian armies began, after the victory at Sadowa, to bend their course towards Vienna. Moving towards Presburg, Prince Frederick Charles came into collision with the Austrians at Blumenau, the last battle-field of the war. In the very heat of the firing news came that an armistice had been agreed to (July 22) ; but the action did not cease until a white flag was carried out in front by an Austrian officer. It was time to stop, as the Austrians found ; for a body of Prussians, having gone forward by a mountain-path, had succeeded in getting to their rear.

The defence of Vienna from the advance of the victorious Prussians then became a primary object with the Emperor of Austria ; but a treaty, first agreed to at Nikolsburg, saved Austria from this ultimate disaster, and brought the war to a close.

The principal conditions of this compact were :—(1.) That the Lombardo-Venetian Kingdom should be united to the Kingdom of Italy. (2.) That the recent German *Bund* should be dissolved ; and that Austria should have no part in newly constructed Germany.

Prussia defeated also the troops of Bavaria, and of Hesse-Darmstadt. Her new acquisitions of territory may be thus contrasted with her territories before the war. The Main may be accepted as the line of demarcation between Northern Germany, strongly united under the leadership of Prussia ; and the states of Southern Germany, loosely grouped under the nominal ascendancy of Bavaria.

#### PROVINCES BEFORE THE WAR.

1. Eastern Prussia.
2. Western Prussia.
3. Posen or Polish Prussia.
4. Silesia.
5. Brandenburg.
6. Pomerania.
7. Saxon Prussia.
8. Westphalia.
9. Rhenish Prussia.

#### ADDITIONS AFTER THE WAR.

Hanover.  
Hesse-Cassel.  
Nassau.  
Hesse-Homburg.  
Three Danish Duchies.  
Hesse-Darmstadt (N. of Main).  
Hohen-zollern.

**A Second Italian War.**—The Italians, burning to free Venetia from the grasp of Austria, gladly seized the occasion offered by the war with Prussia. The opening struggle gave a check to the Italians, who were defeated, under Della Marmora, at Custozza. And the second notable event of the campaign taught them that at sea as well as on land the Austrians were still capable of victory.

At Lissa, a fortified Austrian island in the Adriatic, was fought out a naval conflict, memorable as the greatest practical trial to which the new iron-clad ships have been put. The lines were formed with the iron-clads in front, and the wooden ships behind ; but the battle soon degenerated into a sort of naval tilting, similar to the tactics often pursued by old Roman galleys  
**July 18, 1866** on these very waters. Vessels cruised about under full steam, striving to run their opponents down ; and the wooden ships sometimes found the manœuvre quite *as successful* as did their plate-clad associates. Finally,

the Italian fleet, under Persano, was forced in a crippled condition to run for the shelter of Ancona harbour.

Except for some volunteering skirmishes about Lake Garda, in one of which Garibaldi was wounded in the thigh, these were the chief events of the war, which was closed by a treaty (October 3):—Venetia, given up to Napoleon III. after the battle of Sadowa, was by a formal vote of the people annexed to Italy, which is now complete, but for the Papal States. The Iron Crown has thus fallen to the lot of Victor Emanuel, previously King of Sardinia.

**Abyssinian War.**—During the present year (1868) an expedition was despatched from India to Abyssinia, in order to release the British Consul and about sixty other captives detained by the cruelty of King Theodore. Penetrating a land of gigantic mountains, through which a practicable road was made by blasting and the toil of engineers—carrying cannon on the backs of elephants—and suffering all the hardships and dangers that beset a flying column in a hostile country yielding little food, the army pressed on, under Sir Robert Napier, to Magdala, which was stormed. The captives had been previously set free. The Snider breech-loading rifle, with which our troops are now armed, completely withered the wretched Abyssinian attack by the rapidity of its fire.

## CHAPTER III.

## THE ATLANTIC CABLES.

GREAT as is the undoubted wonder of communication on land by electric fluid, it must yield the palm to that strange achievement of recent times, which sinks a thin rope in the ocean depths, uniting by this slender link of thought the Old World and the New. So delicate is the power of this invention that it has been said, "With a little diluted acid in a copper percussion-cap and a strip of metal like a pin, an electric current can be formed powerful enough to carry a sentence across the Atlantic." Can antithesis be finer or more strong?

Let us first state the theory on which this great triumph of science has its foundation. The ocean, or any sheet of water, acts as a conductor of electricity as effectively as if it were a wire. This part of the circuit being therefore ready-made, it only remains for the electrician to complete the round. A wire attached to the copper end of the battery, being protected by gutta-percha, or some other insulating substance capable of resisting the action of water, is sunk in the sea and carried over to the opposite shore. There it is joined to the needle, whose twitchings are so eloquent, but is then bent backwards and fastened to a broad metal-plate below the sea. A similar plate of metal on the other shore, sunk also under the water, is attached by an uninsulated wire to the zinc end of the battery. Between these two sunk plates the ocean acts as a conductor.

Professor Morse, a distinguished American electrician, first formed, in 1842, the idea of conveying the electric message under water; and by an experimental wire laid from Governor's Island to Castle Garden, a distance of a mile, was preparing to prove the practicability of his scheme, when a ship, hauling up her anchor, broke the wire, and

spoiled his experiment. But he soon made a more successful trial. A short wire under Portsmouth harbour was then laid for the purpose of convenient communication between the Admiralty-house and the Railway-station.

No sooner were these successes attained than the sublime idea sprang into existence of connecting America and Europe by a submarine wire. All acknowledged the grandeur of the idea, but few dreamed that it was anything more than a spark struck off from some heated imagination. Practical men regarded it as an impossibility, from the various obstacles and perils that would certainly have to be encountered. They pictured the might of waves and currents, which would snap the wire like a thread—the rush of whales—the grinding of icebergs—the entanglement of sharks or sword-fish by some of their spiny fins—the floating wreck-wood and drowned men—and other dangers, which remind us of the sea-bottom drawn by Shakspeare in Clarence's dream. And even if that point were reached, when, from the semi-solidity of the water, the wire would (as savants thought) remain suspended or supported, what guarantee have we (they demanded) that electricity will retain its power under such conditions. As is always the case, opposition served only to give new force to investigation; and at last the glorious Truth, dimly guessed at from the first, forced its way to the gaze of men; and the Submarine Cable became a thing achieved.

The engineer, to whom this great result in its earliest practical form must be assigned, was Mr. Jacob Brett, inventor of a printing telegraph, which he adapted to submarine use. The first experiment took place in 1851, when a wire, wrapped in gutta-percha, was laid from the Cliffs of Dover to Cape Grinez near Calais. It lived just one day, having been cut among the sharp rocks on the French coast; but the trial established the great utility of gutta-percha as a means of insulation.

The discovery of gutta-percha—a gum exuding from trees in the East Indian islands—came just at the critical moment to aid in establishing this great submarine system. How marvellous it seems that the secret of this gum has been locked in distant islands during all the centuries; how many



trees have leafed and died without apparent use while waiting for the time of discovery and application!

The second Cable, laid down between Dover and Calais, was a complete success. Twenty-seven miles in length, it consisted of four copper wires, each enveloped in a coating of gutta-percha. A covering of tarred hemp encloses this core, the whole being guarded by spiral coils of galvanized wire. It weighed seven tons a mile.

In 1853 a Cable of six wires united Dover with Ostend; and in a few years every narrow sea in the vicinity of England bore under its waves the mystic rope of union.

The idea of an Ocean Cable now revived with new force. Ireland and Newfoundland, approaching within about two thousand miles of each other, were selected as the most favourable portions for a trial. It was also ascertained, by sounding, that between those places the basin of the Atlantic contains a gently undulating plateau of considerable breadth on which the Cable might rest in safety, undisturbed even by currents, for a snow of the most fragile microscopic shells, that break when breathed on, lies uninjured on this sunken table-land—a thing that could not happen if its surface were swept by strong streams.

As might have been anticipated, there were some failures before the successful achievement of this great enterprise. Brett, Bright, Whitehouse, and Cyrus Field united in designing an Ocean Cable. Seven copper wires, in three coats of gutta-percha, with jute, tar, and iron wire to complete the wrappings, formed the rope, which was constructed at Greenwich and Gateshead. The shore-ends, in order to withstand abrasion by sharp rocks, were made more massive.

The *Agamemnon* and the *Niagara* took this Cable on board in 1857, and started from Valentia, an island off the Kerry coast in the south-west of Ireland, in order to pay out the coils and land the other shore-end at Trinity Bay, Newfoundland. When three hundred and thirty-five miles of Cable had been laid, the electric spark, which had been continually running backwards and forwards to and from Valentia, suddenly stopped and as suddenly returned, when the electricians were on the point of cutting the rope and abandoning the enterprise. But before morning, as the ship

was lifted violently by the waves, a brake was put on the Cable, after which a sharp jerk overstrained and broke it.

Mr. Whitehouse made some important discoveries with regard to the difference between a railway-wire and one sunk in the sea as transmitters of electricity. The sea-water, acting through the gutta-percha, brings into play a second electric force, which weakens that flashing through the wire. It was also found that, by its conserving power, a long wire produced a stronger effect than a short one. The battery used to work the Submarine Cable was formed of silver and zinc in large plates, in ten cells of gutta-percha. So powerful was this machine, that a mimic thunderstorm, with sharp cracks and keen flashes, could be produced by its action.

In 1858 the *Niagara* and the *Agamemnon* met in mid-ocean, and after splicing the two parts of a Cable constructed to bear a weight of nearly four tons, sailed for the opposite shores, paying out as they went. Three times the Cable broke, and was spliced; but the fourth effort proved successful. Great was the joy over all the civilized world; and a congratulatory message from Queen Victoria to the President of the United States hailed the completion of a work calculated to promote peace and good-will on earth.

Aug. 5,  
1858  
A.D.

But in less than a month a strange stammering seized the wire, as if palsy had affected its utterance; and it soon altogether lost the power of speech. Dismay seized the company, whose money now seemed hopelessly buried in the depths of the sea. A leak in the rope was revealed by the electrical tests applied; it lay two hundred and seventy miles from Valentia.

So great was the shock of this disappointment, that seven years elapsed before another effort was made to complete a successful Ocean Cable. In the meantime, however, the narrower seas of Europe and Asia received several short Cables. A line was laid down the Red Sea to India in six sections, with stations at Aden, Muscat, and Kurrachee. But this proved faulty. An important and successful Cable was laid in 1861 between Malta and Alexandria. This had seven wires in its core. In 1864 Sir Charles Bright placed

in the Persian Gulf a line, most carefully constructed and coated with pitch, silica, and tar. Between Cartagena and Oran the Cable broke for want of submarine support; for the sea-basin there sinks to a very great depth.

But these details have slight interest, compared with the narration of the complete success which crowned the undertaking of 1866. Profiting by the experience gained by previous failures, the makers of the new Cable, Glass and Elliot of Greenwich, adopted a core of seven fine copper wires, wound into a spiral form, and covered with iron wire coated with hemp which had been soaked in sea-water and saturated with tar. After this had been subjected to careful tests, it was coiled in three enormous tanks of wrought-iron, which had been built to receive it on board the *Great Eastern*. Some of the requirements, "a ship big enough, and a wire long enough," had been met; it remained to find "a sea smooth enough" to lay the monster rope.

After the shore-end of the Cable had been attached to the batteries, the *Great Eastern* left Valentia harbour (July 23, 1865). Two days after starting it was found that a fragment of loose iron wire had forced its way through the coatings and was in contact with the electric core. It became necessary to cut out the piece, and splice the Cable. Splicing is a delicate operation, requiring much care. Having pushed back the gutta-percha, the workmen proceed to file and fit the broken ends of wire, which are then soldered, and wrapped in coils of fine copper wire. When the joint is washed with naphtha, and smeared with a compound of resin, the gutta-percha is worked over it, bound, and polished.

A similar accident befell the Cable on the sixth day, Aug. 2, but the crisis came later. On the 2nd of August, 1865 "a sad and memorable day," a grating noise was heard as the Cable was paying out. "There is another wire," cried one of those who heard it.

The ship was stopped, and the slow process of hauling in began, during which a series of disasters occurred. The eccentric gear went wrong; the steam failed; the water in the boilers ran nearly out; and then the great ship was left drifting to larboard, so that the Cable, drawn out to the sea on the starboard side, came to undergo a heavy oblique

strain. The Cable next caught in a projection at the bow, and, the wind shifting, began to chafe on the ship. A further strain was now put upon the line by a wire rope which was used to free it from its hold. The dynamometer—which showed the extent of strain—received a sudden jerk, which caused the line to fall violently on a lower wheel, and in a few seconds, with a flash, the Cable snapped, and plunged into the sea. When the spectators, pale with vexation, saw this end of their toil, tears sprang to some eyes. Dr. W. H. Russell, the famous correspondent of the *Times*, to whose graphic pen we owe a narrative of these events, tells us, “that when a man came aft with the inner end still lashed to the chain, and we saw the tortured strands, torn wires, and lacerated core, it is no exaggeration to say that a strange feeling of pity, as though for some sentient creature, mutilated and dragged asunder by brute force, passed through the hearts of all.”

A resolve was immediately taken to grapple for the lost Cable. And never had the Atlantic witnessed a fishing scene like that which followed. The line consisted of wire buoy-rope, and was five miles long; the hooks a couple of anchors, weighing some hundredweight, and formed with five arms, toothed, fluked, and curving sharply in; the fish they sought was that great Sea-Serpent, worth a million pounds. Steaming ten or twelve miles to the east, the ship lay to, and when the grapnels were thrown overboard, she began to drift towards her former track. As the line ran out over the gigantic reels, water thrown upon the iron to cool it flew into clouds of steam. At last the bottom was reached, 15,000 feet down; and the trolling began.

During eight days the Cable was seized thrice, as the giant ship drifted in fogs over the place of the disaster. But the line was not strong enough to bear the weight, and on each occasion broke. On the 3rd, the day after the snapping of the Cable, five hundred fathoms of the rope had been hauled in, and there was evidently a heavy strain on the line, when it broke. Four days later the wire rope, parting at a swivel, is described as flourishing “like a mailed and menacing hand” ere it plunged into the sea. The third failure took place on the 11th. Leaving buoys to

mark the spot, the *Great Eastern* sailed back to England, while the *Terrible*, her consort, bore the news to America.

Success lay behind these disasters. A combination of companies, no wise disheartened by the losses and failures already suffered, resolved to attempt a double work in the lifting and repair of the broken Cable, and the laying of a new one.

The new Cable, stronger, lighter, and more flexible than the old, measured 2730 miles, and bore a strain of eight tons. On board the *Great Eastern* improvements were made in the machinery for paying out and hauling in the rope—drums with reversing action being placed at both stem and stern. A cage-work, or “crinoline guard,” was put round the screw of the ship, lest its arms might become entangled with the line. And through the winter the most eminent electricians continued their experiments at Valentia, putting the submerged Cable to every test.

The great ship started—July 13, 1866—on her important voyage, after having spliced the heavy shore-end to the main Cable. Cannon boomed; bands played; flags fluttered their gay colours, as the stately vessel turned her head fairly to the ocean waves—this time to succeed. On the morning of the 27th July the shores of Newfoundland broke the horizon; and by breakfast-time the Cable was severed, in order that it might be spliced to the shore-end. And on the 28th the rejoicing workmen sprang into the sea, hauling up upon the beach of the New World the completed link. As had happened before, the first message transmitted through the Cable was a telegram from the Queen to President Johnson. But a stronger proof of the vast success which had crowned the enterprise of 1866 was the transmission of a telegram from New York to Bombay.

Then the fishing began anew. Twelve months had passed since the old Cable sank with a victorious flourish of its broken wires to the bottom of the ocean. Observations had been carefully made of the latitude and longitude at which the line broke; so that there was no difficulty in ascertaining the correct place in which to begin dragging. As before, there were many excitements, hopes, and disappointments; but these are incident to fishing of every kind. On the

17th of August, however, it seemed as if success was attained, for the Cable, its lower half stained with white ooze, and its upper still dark with tar, actually appeared above the waves, hauled from its year's repose two miles below the surface of the water. But, as if to realize in modern days the legend of Tantalus, the echoes of the cheer which greeted the recovered rope had not died away, when it slipped from the flukes of the grapnel, and dived with scarcely a splash. Perseverance at length attained its object. The three ships—*Great Eastern*, *Medway*, and *Albany*—took up positions which enabled them to attempt the raising of a portion into a festoon between two buoys. On 2nd September the Cable was successfully lifted to the surface, and an electric message carried the joyful news to Valentia. The following description has been given of the moment of success :—

“The picking up went on with its usual certainty and precision, and by twelve o'clock (midnight) the bows of the ship were crowded, not only by those actually on the watch, but by nearly all the hands, who turned out to see the result of this attempt to recover the Cable. Precisely at 12.50 this morning the Cable made its appearance upon the grapnel ; and, save when the voice of Captain Anderson or Mr. Canning was heard giving an order, one could almost hear a pin drop, such was the perfect silence that prevailed. No excitement, no cheering, as there was on the Sunday when we lifted it before ; all was calm and quiet—the men scarcely spoke above their breath. After some precautionary operations, the signal being given to haul up, the western end of the bight was cut with a saw, and the Cable then rose over the bows of the *Great Eastern*, slowly passing round the sheave at the bow, and then over the wheels on the fore-part of the deck.”

No sooner was the old Cable on board than it was examined with minute attention. To all appearance it was uninjured ; but the critical test had yet to be used. Mr. Willoughby Smith applied the end to his instruments, as all stood eagerly by. “Presently he raised his hat and gave a cheer—the *Cable spoke* !” Cheers and rockets rose into the sky in gratulation upon this happy circumstance. About

the same time an electrician, watching in the room at Valentia about a quarter to six on the Sunday morning, saw some twitch of needle, or other movement, on the index-board, which showed that the old Cable, silent so long, had begun to use its voice. After a few preliminary stammerings, it spelled out its burden with as much truth and distinctness as did the Cable just laid down. From Valentia the glad news flashed to London; and next morning the press proclaimed it to the remotest corners of the kingdoms.

Westward then sailed the *Great Eastern*, paying out the new addition spliced to the old Cable. An enormous depth, amounting to two miles and three-quarters, or forty times the height of St. Paul's, was reached by the descending rope; but its end was at length, on the 8th September 1866, safely carried in upon the shore at *Heart's Content* in Newfoundland, in presence of the Governor, the Bishop, and other dignitaries of the island.

There then they lie—side by side—uniting the two Worlds, between which the dividing Atlantic has rolled from the Creation. How vast an influence such a union shall exercise upon the future destinies of the human race, it is impossible to estimate. The two great branches of the Anglo-Saxon race, speaking one language and inheriting the same history, have thus received a new bond.

As we read in the newspapers of events which happened yesterday in America, it is easy to forget how much labour and skill must have combined to produce those short but pregnant sentences, that tell of the impeachment of a President, or the state of a cotton market. But, when we pause to think of "the difficulty of encasing a bundle of thin wires, more than two thousand miles in length, in a tube of gum, and that without the slightest fissure or most minute pin-hole in the whole of that length—of the difficulty of casing this with a material sufficiently strong to protect the inner core from strain or friction, and of depositing it at the bottom of the Atlantic, in many places more than two miles in depth,"—we are filled with wonder at the greatness of the achievement.

The three chief Cables at work at present are, the At-

lantic, 2500 miles ; the Red Sea, 1358 miles ; and the Persian Gulf, 1150 miles in length.

Beginning with £20 for the shortest message, the Atlantic Cable Company have recently reduced their minimum to £5, with the result of increasing their profits at this lower rate. A further reduction is expected, and will be gladly greeted by the public ; for the wires could undertake much more than the work they now do.



## CHAPTER IV.

## THE EAST.

ALLUSION has been made in previous chapters to the establishment of that Overland Route to India and the East, which has reduced the time of travel between London and Bombay to about a month; and also to the completion of the Indian line of Electric Telegraph, which enables friends to correspond in a few hours, instead of waiting for the tedious course of mails, with all their vexations and delays. The East has thus been bound to Europe with closer links; and every change affecting its destiny—especially any change in India, an empire where so many of our friends are placed—is more acutely felt at home than used to be the case.

**Indian Mutiny.**—For many years India had been so tranquil in outward aspect, that few men saw any signs portending a disastrous storm. The British proceeded with their policy of annexment, adding the territories on the Indus, and those at the mouth of the Irrawady, to possessions already somewhat unwieldy; and the last act of annexation—that of Oude in 1856—was not accomplished without the rousing of much bad blood towards the English rule. But still none—or very few—foresaw a storm.

There was nevertheless a floating discontent among the native Hindoos, especially such as professed the Mohammedan creed; and it fed upon a mysterious prophecy to the effect that in a hundred years after the battle of Plassy, which occurred in 1757, the natives should oust the Britons and recover their freedom. A supposed desire on the part of the British Government to interfere with the religious belief of the natives made the latter very watchful and suspicious regarding every order which bore in the least upon *their rites*. Hence arose a popular story, assigning as a

cause of the Mutiny the refusal of sepoy to use greased cartridges. In a simple device, intended to secure an easy admission for the cartridge into the barrel of the rifle, they saw a cunning plot to deprive them of caste, and render them what they regarded as an easy prey to the Christian missionaries, by forcing them to put to their lips the sacred fat of cows.

On the 10th of May 1857 some privates of the 3rd Bengal Cavalry, stationed at Meerut near Delhi, opened fire upon the prison, where some of their comrades had been confined for insubordination with regard to the cartridges. The burning of houses and the killing of white people followed. Gathering reinforcements as it rolled onward, the mass of mutineers approached Delhi on the Jumna, which they occupied, but not before a prompt hand had fired the magazine. When the news reached Lucknow, the capital of Oude, a similar outbreak occurred; and these two cities became centres of the tragedy.

The Punjaub would also have been in a blaze of insurrection, but for the promptitude of Sir John Lawrence, who disarmed his sepoy at once upon receipt of the alarming tidings.

The scene of the Mutiny in its most tragic phases belongs entirely to the basin of the Upper Ganges; centres, in fact, round these sites, Delhi and Lucknow, already named; to which must be added the blood-stained Cawnpore.

The siege of Delhi, round which a few thousand Europeans gathered on the 4th of June 1857, lasted for more than three months. The extraordinary efforts of Sir John Lawrence, Commissioner in the Punjaub, contributed mainly to wrest it from the hands of the mutineers, September 20.

The Europeans at Cawnpore committed the terrible blunder of trusting to the good faith of a fiendish Mahratta, called Nana Sahib. Surrendering in the expectation of being safely conducted to Allahabad, they were butchered in cold blood; men, women, and children dying in an indiscriminate massacre, which has scarcely a parallel in history.

The story of the defence and the double relief of Lucknow contains the most romantic details. When the sepoy at Lucknow mutinied, the Europeans took shelter in a fortified

building called the Residency, where for four months they endured the sufferings and horrors of a siege. Thousands of dark-skinned demons surrounded them, yelling incessantly ; their food and water ran low ; and the unburied dead, decaying in the torrid sun, filled the air with vapours of deadly disease. At length the victorious Havelock, whose name shines like a star above the dark clouds that rolled over India during this terrible year, fought his way inch by inch from Cawnpore to their relief ; and, crowning his battles with a successful struggle through the narrow streets of Lucknow, lined with musketeers, entered the Residency in triumph (September 23).

But an unforeseen trouble ensued. The relievers were themselves besieged, under circumstances which but deepened the distress of the garrison ; and for nearly two months the extremities of famine and distress were suffered by the beleaguered forces. At last Colin Campbell arrived at the Alumbagh, whence his flag could be seen by the straining eyes of the sufferers shut in the Residency. A gallant young clerk named Kavanagh, dressing himself in the disguise of a native soldier, carried a plan of Lucknow and its approaches to the relieving general, who fought his way through the tortuous lanes of the city, and finally relieved the almost hopeless prisoners (November 17). To Sir Colin Campbell, afterwards raised to the peerage as Lord Clyde, was due the final extirpation of the mutineers. The fall of Bareilly (May 7, 1858), may be regarded as the closing event of the Indian Mutiny.

**Chinese Wars.**—War is one of the chief modes in which countries jealously sealed against foreign intrusion have been opened to the benign influences of commerce and religion. China affords, during the present century, a striking example of this :—

1. The first Chinese war began in 1839, owing to a quarrel about opium, a drug which the Chinese authorities strove—wisely and naturally—to keep out of the country, but which certain British merchants—selfishly and unscrupulously—insisted on forcing into Canton. The capture of Chusan, the destruction of the Bogue forts at the mouth of the Canton River, and a march upon Nankin (1842), were among the

principal events of the war, which ended in the cession to Britain of Hong-Kong, and the opening to British commerce of five important seaports.

2. A second war opened in 1856. Its immediate cause lay in an outrage by the Chinese police, who boarded in the Canton River a *lorcha* or small smack, on which the British flag was flying. Yeh, the Commissioner of Canton, refused to give any satisfaction to the English Minister; and the speedy result was an attack upon the forts defending the city, and a bombardment of the city itself. Yeh held obstinately out, in his sublime complacency offering rewards for the heads of those barbarians who had dared to assail a city of the Celestials. When the Plenipotentiaries arrived—Lord Elgin to represent Britain, and Baron Gros to represent France—a demand was made that British subjects should be admitted into Canton; and, when a refusal was received, the bombardment of Canton was recommenced. Next day the French and the English, advancing together to the breach, poured into the city. The corpulent Yeh, who strove to hide his majestic presence under a porter's dress, was taken, and conveyed as a captive to Calcutta. Following up this sharp blow, the Plenipotentiaries forced their way up the Peiho to Tien-tsin, where (June 1858) a treaty was signed, opening, in addition to the five ports already alluded to, five others; and allowing British subjects, who had passports, to travel where they pleased in the interior of the country, which had hitherto been most jealously sealed.

3. Our third war with China originated in the following manner:—As our Envoy, Mr. Bruce, in company with a French Commissioner, was entering the Peiho, in order to ascend to Tien-tsin for the purpose of obtaining a ratification of the treaty already agreed to, the Tartar forts at Taku opened a treacherous fire upon his squadron. This provoked immediate war. Sir Hope Grant took the command of an English force, which, in conjunction with French troops, landed on the mud banks of Pehtang, about twelve miles north of the Peiho. It may be mentioned as a curious instance of the fickleness and treachery in the Chinese character, that our soldiers in Shanghae were attacked by the Taeping rebels, although these, living in a state

of chronic insurrection against the Chinese government, would have been, in another and less eccentric land, almost surely counted upon as adherents to our cause. After the heavy rains had ceased, our troops began to move (August 12), the foremost column being led by Sir Robert Napier, whose recent success in Abyssinia has earned for him the title of Lord Napier of Magdala.

The first undertaking was an assault upon the Taku forts, whose fire had caused the war. These, defended strongly with wet ditches and bamboo stockades, mounted no fewer than 400 cannon. But the fire of our Armstrong guns, at a range of 2000 yards, completely silenced the Chinese thunder. Plunging knee-deep in the mud of the ditches, the French and English infantry commenced to clamber up the broken walls as each best could. They struggled on in single file : one, standing on the top of the wall, received and fired the rifles handed from below ; officers stuck their swords into the chinks of the wall, and found on the blade a footing which enabled them to reach the top. In spite of a gallant defence by the Chinese, who flung down on the climbers grenades, stink-pots, and even cold shot, the forts were carried. In a short time afterwards the French and English flags were flying on the ramparts of Tien-tsin. So great was the indignation of the Emperor at the cowardice of his lieutenant at Taku, that the officer was deprived of his three-eyed peacock feathers, and his guardianship of the blue banner.

With characteristic treachery, the Chinese, while pretending to be anxious for the completion of negotiations, placed a large force in ambush. Twenty-six British subjects fell unconsciously into the trap and were taken prisoners. Thirteen of these were restored, after much suffering from the cords, which were tied so tight as to cut into the flesh ; but an equal number were carried into the interior and barbarously murdered. This force was defeated and driven back ; and, the prisoners not being yet surrendered, the army of the Allies advanced upon Peking. It was not, however, until the Summer Palace of the Emperor had been entered and sacked that some of the captives were restored. The abundance and variety of the *loot* (plunder) secured here were remark-

able. Carved ivory-work—ornaments of the curious green stone called *jade*—clocks and watches—dresses with the imperial dragon worked in gold and silver thread—boots—fans—rolls of silken stuffs,—lay tossing about in every direction. The cannon were then placed in position for the bombardment of Pekin ; but the Celestials (as the Chinese people modestly call themselves) preferred to open their gates and yield to the demand of an unconditional surrender. The Tricolor and the Union-Jack then waved side by side over the capital of China, while the Emperor hurried away to join a hunting party, which, he declared, the law compelled him to attend.

In order to mark his abhorrence of the treacherous cruelty which had doomed so many of his countrymen to death, Lord Elgin caused the Summer Palace — a collection of buildings scattered over a vast park—to be burned to the ground.

The principal conditions of the treaty then made at Pekin were—(1.) That a representative of the British Court should reside at Pekin ; (2.) That Tien-tsin should be open to British trade and residence ; (3.) That a part of the bank of the Canton River, called Cowloon, should be ceded to Britain.

**Japan.**—No part of Asia has been so jealously sealed against the intrusion of foreigners as Japan. Except the Dutch, who long enjoyed some peculiar privileges of trade, no Europeans were permitted to send ships to these islands. After the second Chinese War, however, it devolved on Lord Elgin to proceed to Japan in order to secure a treaty of commerce between the British and these exclusive Asiatics. Carrying with him a steam-yacht as a present, he sailed up to Jeddo, passed the barrier at Kanagawa, and anchored opposite the green forts, a mile and a half from the city. Japanese envoys came to beg him to return, alleging as reasons the insecurity of the anchorage and the difficulty of obtaining provisions ; but with his suite he landed, nevertheless, in gunboats drawing only seven feet of water. Seeing that this resolute barbarian would not be denied an audience, the authorities formed a grand procession to court, led by policemen in harlequin dress, jingling iron rings to clear the way. At Jeddo, which is as large as London, and has gates

at the end of every street, the Ambassador remained eight days, during which he secured from the Tycoon a treaty, opening certain ports to British commerce, and permitting pilots to assist British vessels in reaching their anchorage. Our relations with Japan have been slightly disturbed on one occasion since ; but we have obtained a hold upon a previously unknown country, which will ultimately no doubt improve both our commerce and our political strength in the East.

## CHAPTER V.

## EXPLORATION IN AFRICA AND AUSTRALIA.

THE Zambesi and the Nile have been the great arteries of recent exploration in Africa. With the former is associated, solely and splendidly, the name of David Livingstone ; while the achievements of Speke and Baker have been the means of almost clearing up the mystery which has always shrouded the cradle of the Nile.

**Livingstone** embarked for Southern Africa in 1840, as a medical missionary in connection with the London Missionary Society. Born at Blantyre on the Clyde, he began life in a cotton-factory ; but, having taught himself Latin at meal-times and other snatches of leisure, he educated himself for his profession by attending medical classes at Glasgow College during the winter.

After six months of seclusion at Kuruman, north of the Orange River, during which he studied the Bechuana language, he commenced his labours. The friendship of Sechele, chief of the Bechuanas—a potentate who proposed to convert his tribe to Christianity by the use of the rhinoceros-hide whip—proved most serviceable to the doctor, who in 1843 had established a mission-station at Mabotsa. Here he was bitten in the arm by a wounded lion.

And here he began to observe the features of the land and the manners of the natives, who ate roast locusts, caterpillars, and boiled frogs that looked like chickens. When a drought—the great plague of Southern Africa—destroyed their chances of vegetable food, the natives, forming a circle of miles wide, drove the wild animals into an enclosure called *hopo*, formed of hedges like the letter V, with a pitfall at the angle.

On the 1st of June 1849 he started, in company with Messrs. Oswell and Murray, to explore the Desert of Kalahari, which lies north of the Orange River. This district



was not of bare sand, but contained abundance of grass—with little water, however. Two plants supply a copious juice: the water-melon, which bursts out in hundreds after a fall of rain; and a kind of ground-melon, as large as a child's head, which grows about a foot below the surface. The *tse-tse*, a small brown fly, whose bite is fatal to ox, horse, and dog, is the scourge of travellers in these regions.

Having previously struck the Zouga, running in a north-easterly direction, the explorers discovered Lake Ngami on the 1st of August 1849. Then, having travelled northward to Sesheke, Livingstone came upon the Zambesi (June 1851). Having sent his family home, the intrepid explorer prepared for a journey that lasted for four years.

**Livingstone (1852-56).**—He left Cape Town in June 1852 upon this long and arduous course of exploration, during which he crossed Africa from sea to sea—from St. Paul de Loando, the capital of Angola, on the West coast, to Quilimane, near the mouth of the Zambesi. The journey was performed partly in waggons drawn by oxen.

The general view of the physical geography of Africa, thus obtained, resolved the southern part of the continent into three vertical zones: (1.) An eastern zone, mountainous, clothed with gigantic evergreen trees, and peopled by daring and handsome savages, such as the Zulus and the Caffres. (2.) A central tract, undulating and dry. (3.) A flatter region, desert for the most part.

The vindictive feeling of the Boers, descendants of the Dutch settlers, who were possessed of an envenomed dislike to these English intruders, formed an obstacle, harder for Livingstone to contend against than the treachery of the natives or the dangers of the climate. They destroyed his house at Kolobeng, smashing his medicine-chest, and tearing his books to pieces.

The course of this adventurous expedition ran across the Chobe to Linyanti—through the Makololo country to Lake Dilolo, which lies on the watershed between the Atlantic and the Indian Oceans—and then down the valley of the Bengo towards Loando. At this seaport, which Livingstone reached on the 20th of September 1854, he received much *kindness* from the Portuguese residents.

Among the most destructive of African insects, from whose ravages the grass-beds suffer, and even the blankets are not safe, are the white ants, creatures about half an inch long and as thick as a crow-quill. Rushing in a swarm from their holes, or the clay tunnels they build to screen themselves from the birds, these marauders fly for a couple of hundred yards, then unhook and cast off their wings, which they use only for a single flight, and disappear by boring into the ground. When roasted in a mass, they taste like boiled rice.

Returning by Lake Dilolo from Loando, Livingstone struck the Zambesi, which he proceeded to descend. This portion of the journey resulted in the discovery of a magnificent cataract, now acknowledged, under the name of the Victoria Falls, to be the largest known. Twenty miles off, he heard the roar of the tormented waters; and, on a nearer approach, he beheld five great pillars of cloud ascending from the stream. Hence the name, signifying *smoke-sounding*, by which the natives call this wonder. This cataract is notable, not only for its size, but for its strange formation. The river, sweeping grandly over a lip of sharp-cut basalt a thousand yards in width, finds itself imprisoned in a narrow zig-zig chasm of thirty yards, round whose pointed angles it fights its way in foam. So terrible is the strife in this narrow rent, that even the cautious Livingstone, whose style is plain to excess, breaks into a poetic exaggeration as he compares its tumult to a chaos of white comets.

Passing Zumbo and Tete, the explorer made his way down the Zambesi to Quilimane, where he arrived in July 1856. Thence he journeyed home by Mauritius and the Red Sea.

**Second Expedition (1858-64).**—Livingstone's second journey resulted in the discovery of Lakes Shirwa and Nyassa. We have seen him already travelling from sea to sea, and ascertaining that a hitherto unknown region of Africa, instead of trackless sand, contained well-watered grassy valleys, teeming with population, the whole southern portion of the continent taking the form of an elevated plateau, through the fissures in whose sides great rivers escape to the sea. We now find him devoting his toil to the exploration specially of the basin of the Zambesi. An important contribu-

tion to African geography had meanwhile been made by the discovery of Lake Tanganyika by Burton. This lake remains a great unsolved African problem ; for it is as yet uncertain whether it belongs to the basin of the Nile or to that of the Zambesi.

The Zambesi, discharging its waters through a delta of mangrove-swamp, has four mouths. Though Quilimane has been supposed to be on one of these, it stands at the outlet of a separate stream. Ascending the Kongone mouth, whose banks bristle with the screw-palm, in shape like a steeple, the steamer, in whose furnace the fuel consisted of ebony and lignum-vitæ, worked its way to the main current.

The merchandise of Tete and Senna, which are the chief towns on the Zambesi, is carried down in canoes to Mazaro, whence it is transferred overland to the Quilimane River, and so to the sea. On the right bank of the great stream the warlike Zulus are supreme, exacting a tribute from the Portuguese slave-dealers.

Livingstone, arriving (8th September 1858) at Tete, found indigo, as high as a man, growing wild in its streets. Thence he turned back to ascend the Shire (pronounced *Sherry*), a tributary from the north ; but the navigation was impeded by the Murchison Cataracts. A second effort proved successful, and was rewarded by the discovery (18th April 1859) of Lake Shirwa, a sheet of brackish water, studded with mountainous islands and surrounded with elephant marshes.

Having left the steamer on the Shire, in a band of forty-two, of whom only four were whites, the rest Makololo, the expedition pressed northward through the country of the Manganja, whose women disfigure themselves with the *pelele*, a ring worn in the upper lip. A land journey of forty days issued in the discovery of Lake Nyassa (16th September 1859).

The following year was spent in surveying the upper Zambesi. After an inspection of Kebrabasa—a series of rapids and cataracts above Tete, which are smoothed over and made navigable, when the river rises in its *eighty-feet* flood—a stay was made at Zumbo, whose picturesque scenery enshrines the ruins of a Portuguese settlement at the confluence of the Loangwa. Another visit to the Victoria Falls

was followed by a sojourn at Sesheke with the friendly chief Sekeletu. Sailing down towards the mouth, the crazy steamer, which its crew nicknamed the *Asthmatic*, sank, and the explorers spent a cheerless Christmas on the island of Chimba.

Early in 1861 in the *Pioneer*, a new vessel, an attempt was made to explore the Rovuma, a river considerably north of the Zambesi; but a sudden fall in its waters warned the travellers to return to the sea. Having then ascended the Zambesi and the Shire, Livingstone left Bishop Mackenzie at Magomero and started (August 6th, 1861) for Nyassa in a four-oared gig to undertake a careful exploration of this stormy sheet of water. The natives proved to be somewhat advanced in civilization. On the graves of the fishermen lay a broken paddle and a torn net. Among some curiosities of food was a cake, *kungo*, made of the midges which swarm on the lake in dense clouds.

Sad personal affliction now added its pangs to the perils of hunger, flood, and barbarism, that always beset the gallant explorers. Bishop Mackenzie died of fever at Malo, where the tributary Ruw enters the Shire; and Mrs. Livingstone fell a victim to the climate in April 1862.

But there was no time for torpid grief. In a few weeks the explorer began preparations for sailing up the Rovuma. Early in 1863 the *Pioneer* towed a new iron boat, the *Lady Nyassa*, up the Shire. The eastern shore of the lake and a part of its tributary Loangwa were examined before the conclusion of the year. This closed the achievements of four toilsome years. Returning to the mouth of the Zambesi, with whose story his own name is now immortally associated, Livingstone turned his course homeward by Zanzibar and Bombay.

The results of David Livingstone's discoveries are, and will be, most important. A great navigable river, with a seaport near its mouth, has been made known to the civilized world; and its basin has been found to teem with natural fertility, and an intelligent native population. Indigo of fine quality grows wild to the height of five or six feet; cotton abounds luxuriantly; salt effloresces abundantly from the ground; tobacco and the castor-oil plant are common weeds.

But over this fertile and beautiful scene the horrors of the slave-trade hang "like a pall." In this nefarious traffic Portuguese subjects, in spite of the seeming adherence of their Government to an abolition policy, are openly engaged. These human fiends exchange cloth, beads, and trinkets for men and women, and find a profit in joining some natives, who are at war, for the sake of securing captives in battle. Through the exertions, however, of Livingstone and other brave men, the Cross has been now firmly planted in this beautiful wilderness of Southern Africa; and history tells us that from the pure and peaceful beams it diffuses, all foul and wicked things, like the slave-trader and his associates, shrink away and vanish. The cessation of traffic in blood by the United States—till recently the greatest market for slaves—will, no doubt, exercise a most salutary influence in repressing this deadliest of all the evils that have their root in "the love of money."

**Third Expedition.**—In April 1865 Livingstone set forth upon a third journey, the issue of which is as yet shrouded in uncertainty. In March 1867 a startling rumour reached England to the effect that the great traveller was dead—cut down from behind with an axe by a native in a struggle which took place near Lake Nyassa. The story rested on the evidence of some Johanna men, who, according to their own confession, ran away from the danger. The notorious character for falsehood borne by these men excited suspicion in some minds, especially of those who knew Africa best. Many clung to the hope that Livingstone was still alive: among these Sir Roderick Murchison was conspicuous. This hope was crowned with triumphant news after a time; and it is now all but certain that the traveller is advancing to the shore, laden with the fruits of new and valuable discovery. The latest news (November 1868) tells us that he was safe at Marungo in December 1867.

**Speke and Baker.**—Among the recent explorers of Africa John Hanning Speke and Samuel White Baker stand conspicuous. The former, an Indian officer, penetrated Africa from Zanzibar in 1857, and discovered, curving round the head of Lake Tanganyika, the horse-shoe shaped range known in Hindoo geography as the Mountains of the Moon. But

his greatest achievement was the discovery (July 30th, 1858) of a vast lake, to which he loyally gave the name of Victoria. This is the famous triangular sheet of water, known on our maps as *Victoria Nyanza*, the latter word being the native for "lake." It was, however, in his later journey, undertaken in company with a brother officer named Grant, that he more fully examined this inland sea, and traced the Nile stream flowing from it to the north. Starting from Zanzibar in 1860, the explorers pressed through the upward-sloping ravines, which led through the rim of the central African plateau. Hindoo traders in ivory and slaves had for ages been accustomed to visit this country of the Moon ; but it was strange ground to the white man. Speke, however, pressed dauntlessly on, paying *hongo*, or tax of cloth and beads, to buy the friendship of the chiefs. At Uganda he did homage to a queen fattened to excessive and fashionable corpulence by the incessant sipping of milk. At Ajundie, going down the Nile, he was for a time kept prisoner ; but surmounting all hardships and dangers, he made his way to the sea.

Baker, ascending the current, met the triumphant travellers at Gondokoro in 1864. This intrepid man, a native of Worcestershire, had been in earlier life noted chiefly as a slayer of elephants in Ceylon. But Africa drew him with irresistible fascination. Accompanied by his wife, who bravely refused to permit him to face the tedious and perilous journey alone, he explored Abyssinia as a preparatory trial, and, collecting stores and attendants at Khartoum, where the Blue Nile and the White mingle their streams, entered upon the great portion of his task. Previous travellers had always mistaken the Blue Nile for the main stream, owing to the peculiar narrowness of the White Nile channel just above the junction of the branches.

There is a romance about the adventures of Baker, derivable from the mingling of feminine devotion with the story of the enterprise ; and he certainly tells his story with a literary finish and grace, which Speke possessed in an inferior degree, and of which rugged David Livingstone is almost entirely destitute.

Baker's crowning feat, achieved in March 1864, was the

discovery of the *Luta Nzige*, which he named the Albert Nyanza, in memory of the late Prince-Consort.

It remains to be seen, by tracing to its source the greatest of the feeders, whose floods supply the giant lakes, what is the actual well-spring of the Nile. This, and the assignment of Lake Tanganyika to its proper basin, for Nile and Zambesi claim it on rival maps, are the great African problems awaiting solution in the future.

#### AUSTRALIA.

**Australia Crossed.**—The Australian bush, as well as the African sands, hides the bones of martyrs. Leichart went forth into the heart of the mighty island, life in hand, and perished of his zeal for knowledge. Recent years have witnessed, in the ill-starred enterprise of Burke and Wills, a more splendid success, but a deeper tragedy, than any hitherto achieved or suffered by Australian explorers.

A public meeting at Melbourne, held in September 1858, raised a fund amounting to £3000 to explore the central districts of the island. The local Government supplemented this with a grant of £10,000, and a supply of camels from India. The selection of a chief director formed a task of no slight difficulty. Robert O'Hara Burke, a superintendent of colonial police, who had seen service both in the Irish Constabulary and the Austrian Cavalry, was chosen to lead the expedition; and with him went, as observer in astronomy and meteorology, a young Devonshire man, named Wills. Seventeen men, with twelve months' provisions, started under Burke's command from Melbourne (August 20, 1860).

Menindie was their first important halting-place. Here occurred a dispute, resulting in the retirement of some of the explorers; after which Burke, accompanied by Wills and six men, started from the camp (October 19), leaving the rest to follow more slowly with the bulk of the supplies. Directing their march towards Cooper's Creek, the gallant little party reached it on the 20th of November. At this central position a dépôt of provisions was formed; and then, reducing his number still further, Burke faced the *unknown* perils of the remaining journey in company with

Wills, King, and Gray. This gallant little knot of men, starting from Cooper's Creek on the 16th December 1860, plunged into what has been called "the Sahara of Australia." Their stock, living and dead, consisted of six camels, one horse, and twelve weeks' food.

Shaping their course by the 140th degree of east longitude, and travelling some fifteen miles a day, they pressed northward over a stony land, patched here and there with grass and water. Kangaroos hopped and emus ran plentifully round their path; but they journeyed on, without stopping to shoot these, until they struck a river, variously supposed to be the Albert, the Flinders, or a new stream west of the Albert. This they followed down, until they saw symptoms of ebb and flow and found the water beginning to taste salt. Eighteen miles below the first appearance of these signs they turned, without having actually seen the ocean, but having undoubtedly arrived within a very few miles of its margin (about 11th February 1861). The problem was now solved. Australia had been traversed from south to north: the interior was no longer an unknown mysterious region.

Then begins the tragic portion of the narrative. Leaving a chronicle of their discovery at this northern limit of their path, they turned southward, with insufficient food and failing frames. The country supplied no addition to their half-rations, except the flesh of a few crows and hawks, and the seed of a plant called *nardoo*, used by the natives to make bread. The camels gradually died; and then death struck one of themselves, Gray. The survivors could scarcely muster strength enough to cover their comrade with dust; and, four days later, they staggered, more like spectres than men, into the camp at Cooper's Creek (April 21).

Who could describe the blank dismay, the dumb terror, that seized them, when they found the camp empty—the reserve gone! A single instant shattered those hopes of weary months, which alone had kept their limbs from failing utterly in the pitiless wastes of stone. Could there be a bitterer drop in the cup of suffering? Yes! On the bark of an adjacent tree, the sap yet scarcely dry, were cut the words—"Dig—April 21." *That very morning*



those in whom their hopes, now dead, had rested so much, had left the camp, tired of waiting—despairing of their return.

They dug and found a little food. But it was hopeless to try, with failing strength, to overtake the party that had gone, although these slept that night only fourteen miles away. After a few days of rest they started, but, with a strange fatality, instead of retracing the route to Menindie, by which they had come, they resolved to make for Mount Hopeless (name of sad omen !) in Southern Australia. Had they gone straight back to Menindie, they would have met a relief party, sent to their aid by the authorities of Melbourne.

Before leaving camp, the three starving heroes, Burke, Wills, and King, put a letter, describing their intended route, into a bottle, which they deposited in the *cache*. But they made no mark on the tree above, so that, when the reserve and relief parties met, and the former returned with the latter to the camp, the bottle remained unsuspected in its nook. It was a pitiful series of fatalities.

As the explorers, poorly clad and hungry, plodded towards Mount Hopeless, Wills broke down. Collecting *nardoo* seed for eight days, and laying this, with water and firewood, beside him, the others went on to seek the natives. Burke carried from Wills a letter and watch, intended for the father of the dying man : but the brave leader, feeling the fatal pains in legs and back, which had foretold death in a previous case, laid himself down to die. And so, pistol in hand, at his own express desire, he lay stretched upon the soil whose secrets he had conquered. The faithful King, returning to Wills with three crows, found his friend lying dead, and decently covered the corpse with sand.

King, then tracking the native footprints down the creek, and shooting crows to support himself, managed to escape—the sole survivor of the gallant little band. His service as a soldier in India may have so hardened his frame that he bore the privations of the journey better than the rest.

## CHAPTER VI.

## NOTES OF RECENT PROGRESS.

**Newspapers.**—Few of us, who enjoy our daily paper for a penny at breakfast-time, stop to think how much thought and toil have gone to the production of the closely-printed sheet, teeming with the freshest news from every quarter of the globe. Take the *Times* as an example, since it is the most gigantic of the metropolitan journals. There is, of course, one responsible head or editor-in-chief, who assigns subjects to his staff of literary contributors, and tones their work into harmony with the principles of the paper; there are several sub-editors, lords of the scissors and paste; twelve parliamentary reporters with flying pencils commit the debates to paper, taking their turns of duty in the House; and, besides these, a host of correspondents in the provinces and foreign countries, and frequently a special correspondent in some seat of war or place of particular interest, are busily writing, to appease the public appetite for news.

The two chief causes of the recent progress of newspapers have been the abolition, in 1855, of the Newspaper Stamp, and the removal of the Paper-Duty, in October 1861.

**Machines.**—Reference has been already made to the application of steam to the working of iron. This powerful agent has been also turned to good account in the service of agriculture, especially by the introduction of the Steam-plough.

So early as 1785, Mr. Capel Lloft suggested the idea of reaping by machinery; but it was reserved for the Rev Patrick Bell, minister of Carmylie in Scotland, to reduce the idea to a practical form. His invention, completed in 1826, cuts a path through the standing corn with knives, and lays the cut stalks in even swathes.

One of the most striking and popular inventions to diminish hand-labour is the Sewing-Machine, the work of Elias Howe, a mechanic of Massachusetts, who, like Palissy the potter, underwent terrible hardships in pursuit of success. First patented in 1841, this machine was sold to an English stay-maker for £250 and a royalty of £3. It was pirated in America ; but the inventor fought against the fraud, gained his case, and ultimately grew wealthy by the fruits of his genius. The machines of Wheeler and Wilson, an American firm, are probably the best known in Britain. For tailoring, boot-making, embroidery—the coarsest and the most delicate work—this machine has most valuable capabilities.

**Nitro-Glycerine.**—The invention of gun-cotton has been noticed. About twenty years ago a French chemist named Pelouze observed the explosive properties of Nitro-Glycerine. This substance, a yellowish oil and deadly poison, is made by bringing aquafortis and oil of vitriol into contact with glycerine. It has, so far, been applied principally to the blasting of rock. Fire will not cause it to explode : in fact, a lighted match may be applied to a saucerful, or it will burn with a cotton wick. In quarrying, water may be used to stop the hole into which a quantity of nitro-glycerine has been poured : the explosion is produced by percussion. Terrible accidents have been caused by incautiously striking frozen masses of this compound with a spade or other steel instrument.

**Medical Science.**—At Vienna, in 1772, Mesmer discovered the curative powers of magnetism ; and his name has been applied to the strange process of experimenting on animals by passes, causing them to gaze at a fixed object, &c. Much imposture has connected itself with these experiments ; but there underlies all these grotesque efforts the fact that electricity has a very intimate connection with life.

*Homœopathy* is another offshoot of medical experiment. Towards the end of the last century a German named Hahnemann adopted the process of giving very small doses of medicine, with a view of curing the patient by producing an affection *similar to the disease*. Poisons in minute quantities thus become medicines. The regular practitioners,

who are called *Allopathists*, have so far benefited by the system that they have ceased to drug and drench their patients with physic, as was the old fashion.

The Water-Cure, or Hydropathy, has been recently much applied to the cure of rheumatism and such ailments. Indeed there is no agent of health in the use of which people have recently improved more than water. The daily bath is a habit with most healthy people; whereas our ancestors were content with washing the face and hands occasionally.

**Submarine Tunnels.**—The idea of the Thames Tunnel, a roadway beneath the river, completed in 1843, has expanded in our day to designs of submarine passages on a grander scale. Engineers have published the plans of proposed under-sea tunnels, connecting Ireland with Scotland, and England with France. Great shafts for ventilation would be built at intervals along the line. As yet these plans exist only on paper; but they may be mentioned in order to illustrate the daring enterprise of the age.

**Mont Cenis Railway.**—A wonder of modern engineering has been recently achieved in the construction of a railway over the Alps, from St. Michel to Susa. This line, known as the Mont Cenis Railway, follows the path travelled by Napoleon and his army. It rises to a height of nearly 7000 feet above the sea. Up steep gradients, round the sharp angles of zig-zag slopes, under arched mason-work built to protect the line from the fall of avalanches, the train winds its sinuous way among the glaciers and the snow. This difficult journey is performed by an engine of peculiar construction, having four horizontal driving-wheels, which, by means of pressure, are made to grasp a central double-headed rail, placed on its side and elevated about fourteen inches above the double line of common rails. The carriages are provided with similar wheels; and thus the train can in safety climb and descend slopes, passing along the edge of the steepest precipices. The line measures forty-eight miles in length.

**Volunteers.**—The embodiment of a fine army of defence, by the enrolment in Great Britain of the Volunteers, is too important an event of recent years to pass without notice.

These civilian-soldiers have never—let us thank God—been obliged to take the field ; but of this their very existence is probably a leading cause. In one marked respect the movement has been of essential national service. The Rifle, concerning the improvement of which some remarks have been already made, has now become our British weapon : and in the annual competition at Wimbledon, and the local trials that are continually taking place throughout the island, the finest marksmen win their honours, attaining a wider renown than ever ancient knight won in mediæval lists. And, not content with excelling foreign nations in the construction of rifles and artillery, we send our chosen shots yearly to compete in Belgium and elsewhere with the *élite* of Continental marksmen.

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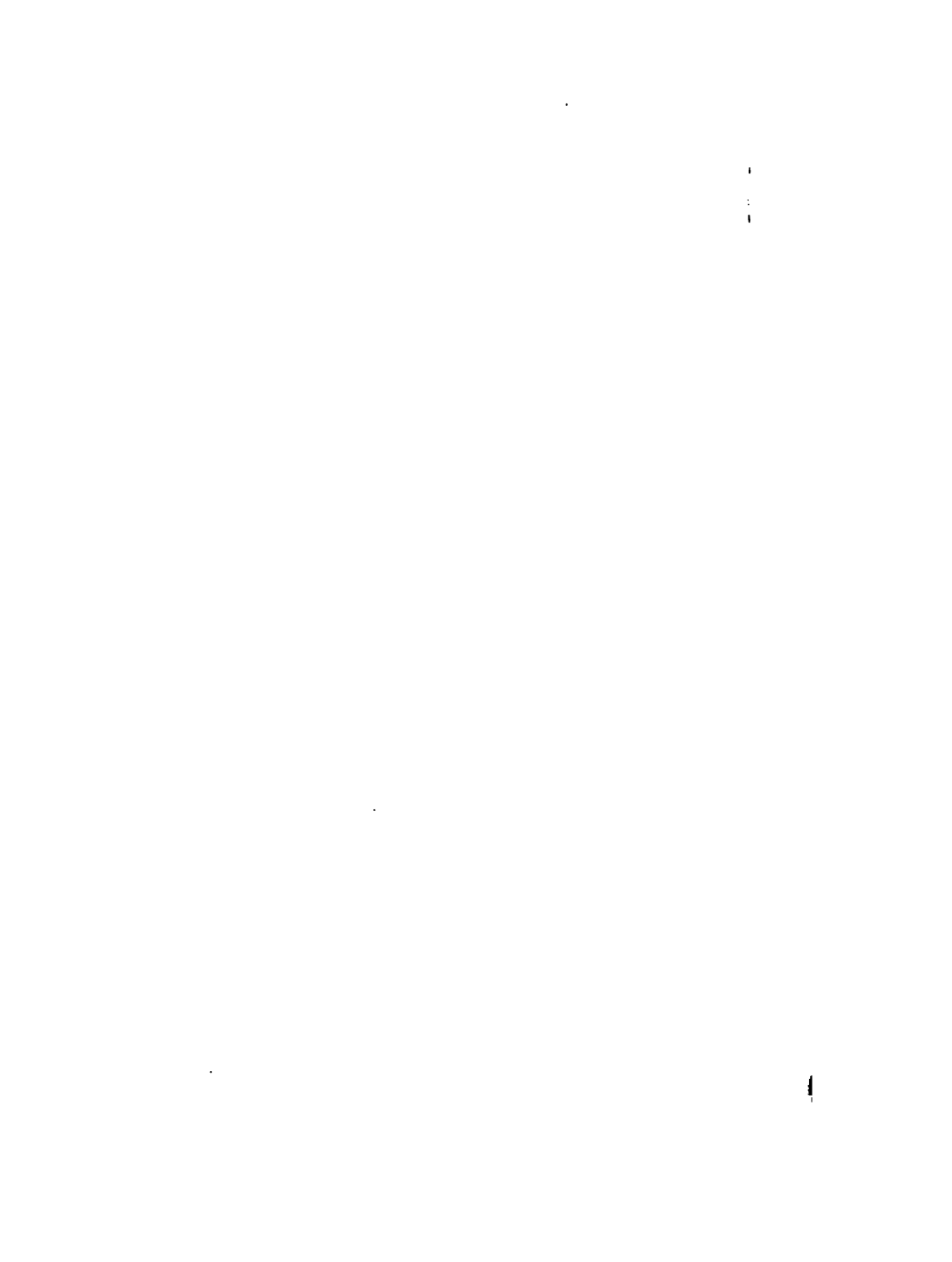
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